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THE IRON AGE

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January 11, 1940

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THE IRON AGE

JANUARY 11, 1940

ESTABLISHED 1855

Vol. 145, No. 2

The Ticket? You Pick It!

IFE in the United States seems to consist, nowadays, of one emergency after another. First it was the bank crisis, next the N.R.A., and now the "limited" war emergency, whatever that means. Probably it is something like a limited earthquake or a limited cyclone.

They say that people can get used to anything and that the civilians of the war-infested countries abroad get so that they take their bombings nonchalantly, even without the aid of cigarettes. Perhaps we too can get used to these emergencies in time. And perhaps familiarity may breed a dangerous contempt.

That would be too bad, for a real emergency might come along some day and we would not recognize it, having heard the little boys cry "wolf", "wolf" so many times. As a matter of fact, the prospects are that when this war is over we are going to face a real emergency of the unlimited variety that will be a good deal more serious in its effects on business than the present limited one.

That coming post-war emergency will have to do with our world trade. Unless something happens to prevent it, we are going to see our foreign trade in manufactured products melt away after peace is declared with the rapidity of an icicle in Gehenna.

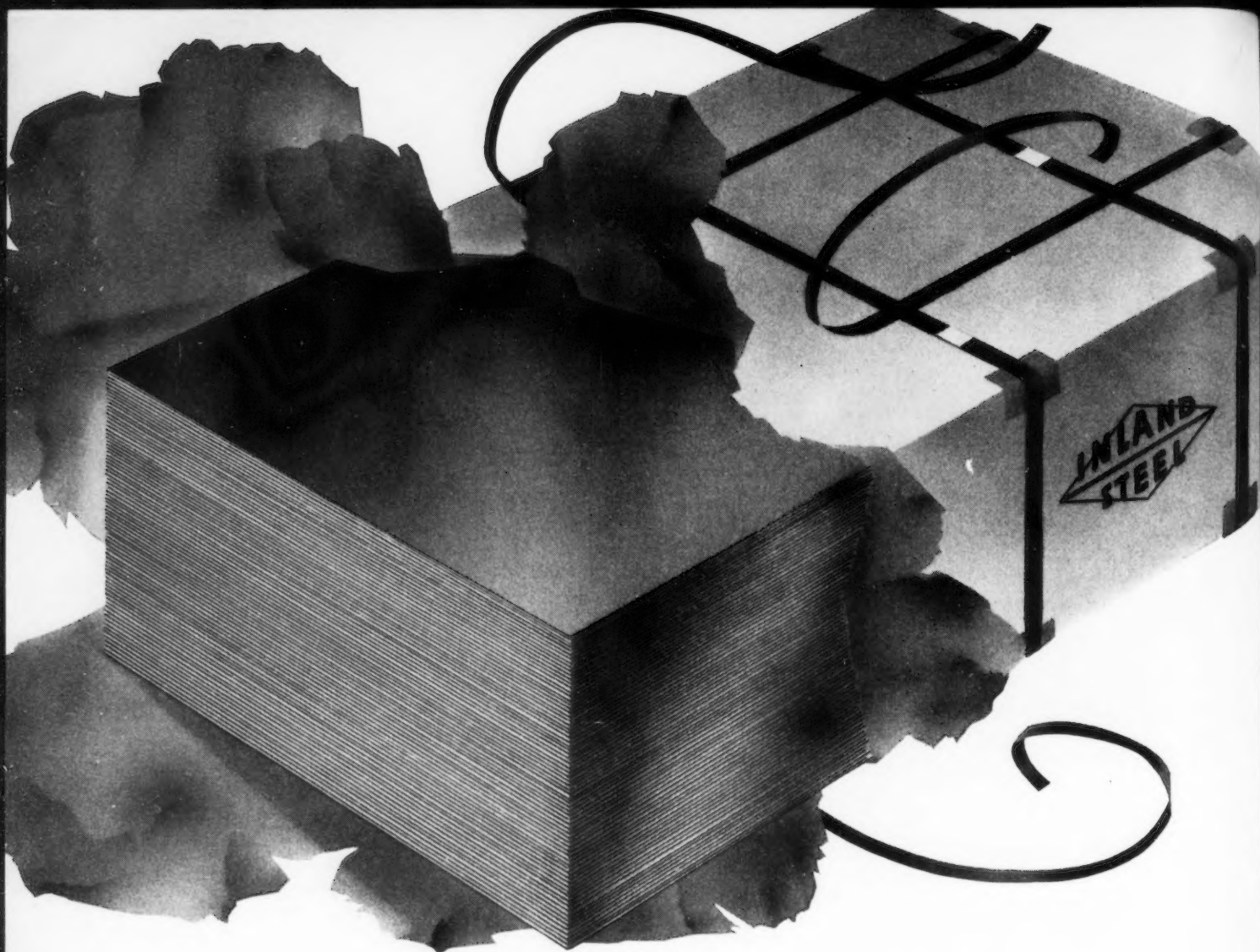
The reason for this is obvious. For the past five years we have been equipping Europe to compete with us after the war is over. By and large, European plants now have newer and better equipment than the plants in this country, in which the average age of half the equipment is 10 years or more. And more than this, Europe, being fully equipped for war, is over-equipped for peace. She will be able to scrap her old machines and "go to town" for world trade with the latest cost cutting devices. With distress labor rates abroad that will ensue, this combination will undersell American products in nearly every market.

That is when our next unlimited emergency will occur. For this cheap foreign competition will not be limited to our export trade. It will dash over our protective tariff walls and through the interstices of our reciprocal trade treaties.

When that time comes, be it one year, two years, or four years hence, we will be out of luck, indeed, if we then face the threat of continuance of an anti-business administration. And the people who will be the most unfortunate will be the wage earners of this country who can no longer depend upon superior machines to defend them against low foreign wage rates.

That is something for everybody to think about in this election year of 1940.

J. H. Hammett



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Flame Hardening of

MEEHANITE

By F. H. BICKFORD

Engineer, Farrel-Birmingham Co., Inc.

A GENERAL discussion of the flame hardening process, equipment used, quenching procedure, and the progressive method of flame hardening are all presented by the author herein. In the second and last section of this report, to appear

next week, various types of hardening machines will be described, as well as the characteristics of the hardened Meehanite case, the minimization of distortion, and the advantages of Meehanite metal flame hardened.

quenching medium immediately after heating.

Equipment

The equipment required depends upon the nature and quantity of work to be done—it may vary from a simple portable hand blowpipe set and pan of water for spot hardening of small parts to a complete acetylene generating system, central oxygen manifold, and a special machine for moving the torches and quenching device over the work.

The oxygen supply station consists of a battery of compressed oxygen tanks connected to a manifold which feeds the distributing line through a pressure regulating valve which maintains a constant line pressure. At each station where the gas is consumed, it must pass through another pressure regulating valve which delivers it to the blowpipe at the pressure required by the operation. The blowpipe mixes the oxygen with acetylene in the proper proportions and delivers the mixture to a suitable head or tip where it is discharged and burned.

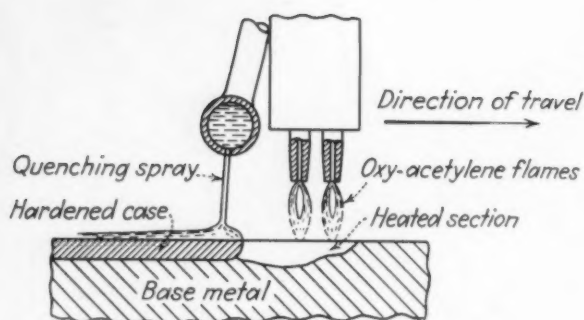
Acetylene is supplied by acetylene generators which automatically maintain a constant pressure in the distributing line. Like the oxygen, it must

ALTHOUGH the process of flame hardening ferrous metals by the oxy-acetylene flame has been in use for many years, it has only recently been developed to a position of great importance in the field of heat treatment. The early refinements of the flame hardening technique were developed in England within the past

decade in an effort to provide a satisfactory means of hardening gear teeth. The contemporary advent of Meehanite metal* has provided a material more amenable to treatment by flame hardening than is the ordinary commercial gray cast iron.

As is generally well known, the flame hardening process is fundamentally simple in principle. An oxy-acetylene flame is so located as to impinge directly against the surface to be hardened, thus rapidly raising the metal to a temperature above the critical point. This temperature, of course, is the same as required by other methods of hardening. Rapid cooling is effected by contact with a suitable

* Meehanite metal for general engineering purposes is produced in five types, known as: GA, GB, GC, GD and GE. Process GA provides a minimum tensile strength of 50,000 lb. per sq. in., a true modulus of elasticity of 21 million, a transverse strength of 3300 lb. per sq. in. (18-in. centers, 1.2-in. bar), and a compression strength of 175,000 lb. per sq. in. Meehanite is used in machinery, machine tool castings, pressure castings and a wide range of castings for many other purposes.



• • •
TYPICAL torch and quench as used in progressive hardening.
 • • •

can be made in special shapes where a plain faced head is not suited. Multi-flame heads require cooling with circulating water to prevent pre-ignition of the gas mixture. This water may be discharged from drilled holes parallel to the flame ports, thus making it unnecessary to use a separate quench.

Quenching

Although it is possible to use a variety of solutions as quenching mediums, plain water is by far the most common. It may be sprayed on the

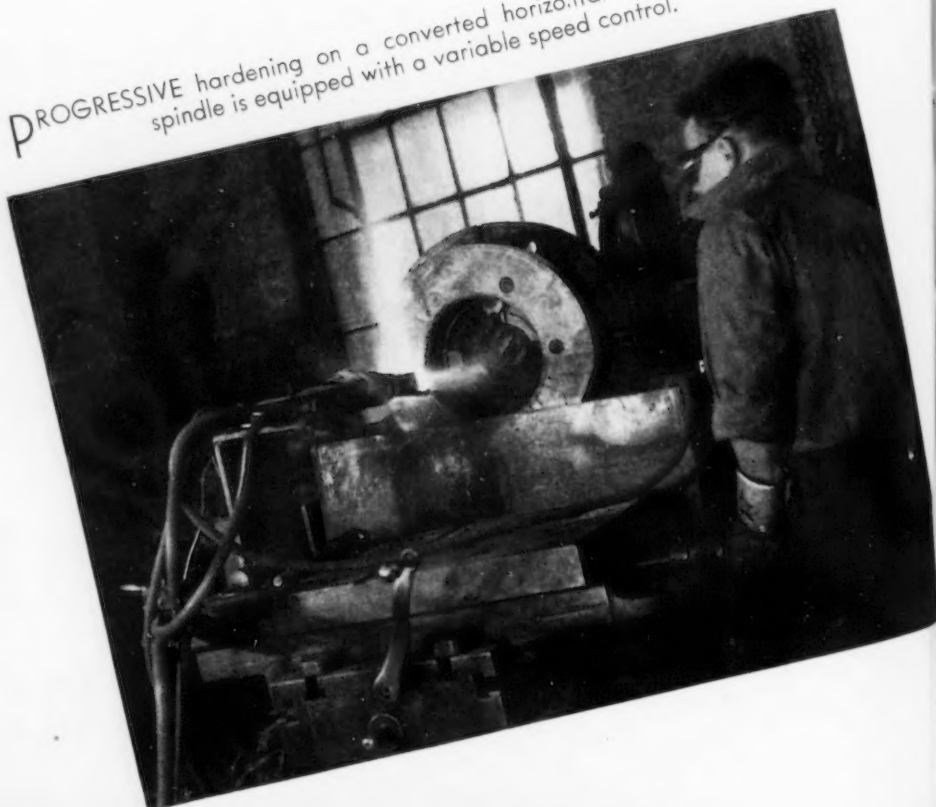
pass through a regulator at each station. Besides delivering the gas at the required pressure, the regulator acts as a safety device to prevent possible backfires from reaching the line. A single quick-acting shut-off valve is usually necessary to give the operator control over the supply of both gases simultaneously. However, they remain in separate hoses until mixed in the blowpipe.

Any torch that will evenly heat the desired surface may be used. A single tip is a suitable burner for spot hardening and progressively hardening narrow areas, such as smaller gear teeth, but does not give sufficient flame coverage for most purposes. A wider flame path is obtained by using multi-flame heads.

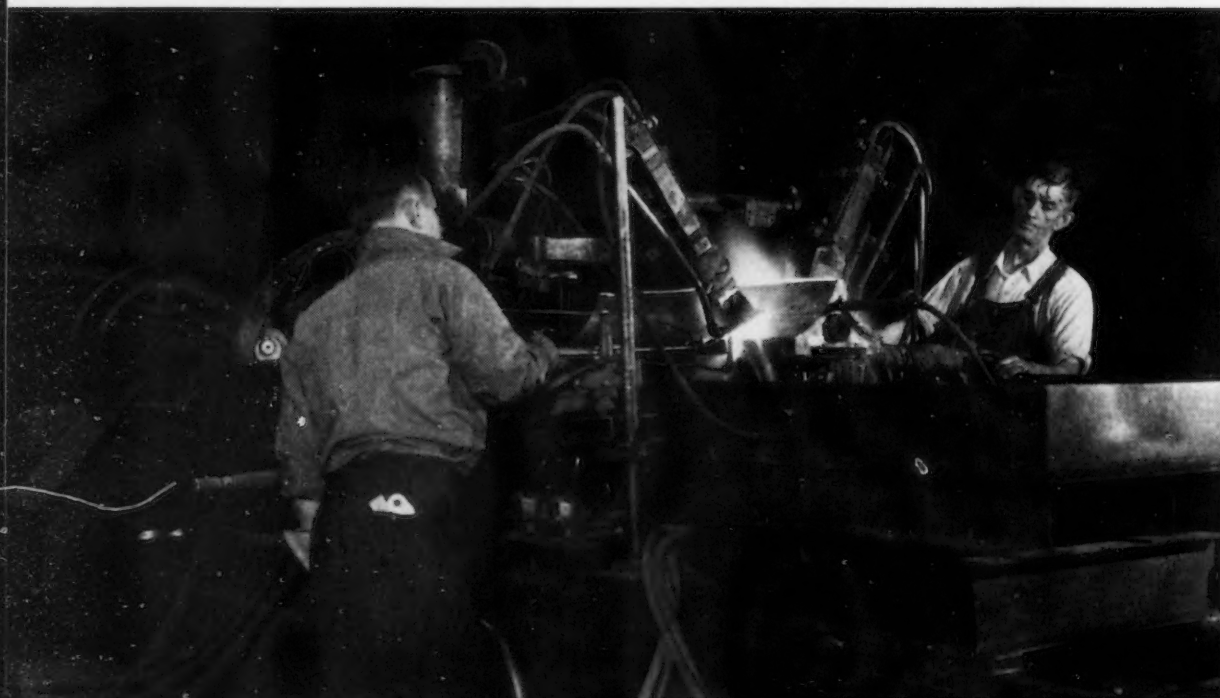
The multiple tip head employs one or more rows of tapped holes into which are screwed small drilled tips. This type of head may be made to conform to a wide range of surface contours by selecting various lengths of tips or using plugs as required. The tips, however, gradually become shortened in service, due to the extreme heat, and continual replacement is necessary.

Plain drilled face heads are being used with good results, however, and

PROGRESSIVE hardening on a converted horizontal boring mill. The spindle is equipped with a variable speed control.



• • •
PROGRESSIVE hardening in a converted lathe. Distortion is held to a minimum by circulating water through the core of the casting. The symmetry of the casting and the simultaneous hardening of both sides are desirable in reducing the distortion.
 • • •



surface as a series of jets from drilled orifices, or in the form of a sheet issuing from a slit. It has been found that quenching by a stream of water is more efficient than total immersion of the part in still water, because the velocity of the stream washes away the steam bubbles as they are formed.

A suitable quench may be made by drilling a row of small holes in a piece of pipe. Considerable experimenting has been done to determine the best quenching arrangement for various types of operations. It is usually desirable to have the quenching water strike the work as closely to the flames as possible, but it is necessary to guard against interference with the flame by splashing or excess water running ahead of the quench. The angle between the quenching stream and the surface treated and the effect of gravity are important considerations. Obviously, the best drainage of excess quench water is obtained when the direction of travel relative to the work is upward. A large volume of clean water is necessary for satisfactory quenching, and pressure fluctuations in the quenching water are to be avoided.

Progressive Method

The progressive method of flame hardening, or variations of it are used in the large majority of general work. It consists of traversing the surface to be hardened with one or a number of flames immediately followed by a spray type quench. This results in a hardened case, the depth and hardness of which are each a function of the traversing speed, the distance between the flames and the work, and the distance between the flames and the quench as measured on the surface.

The width of the hardened path depends upon the width of the burner and may be as narrow as $\frac{1}{4}$ in. or less. There is no upper limit to the width of the area which may be treated, since it depends upon the number of torches available and the maximum rate at which the gases may be supplied. In the case of rolls hardened by the vertical combination method, the width of the heated band is the entire circumference of the roll. The annealing of a previously hardened case may be accomplished by the omission of the quench.

Special precautions must be taken when passing over edges or holes in the work because the heating rate is

increased, and heat dissipation into the body of the part is less rapid. This results in a dangerously high temperature at these places and must be guarded against either by controlling the speeds, or by using suitable shields such as carbon plates or rods.

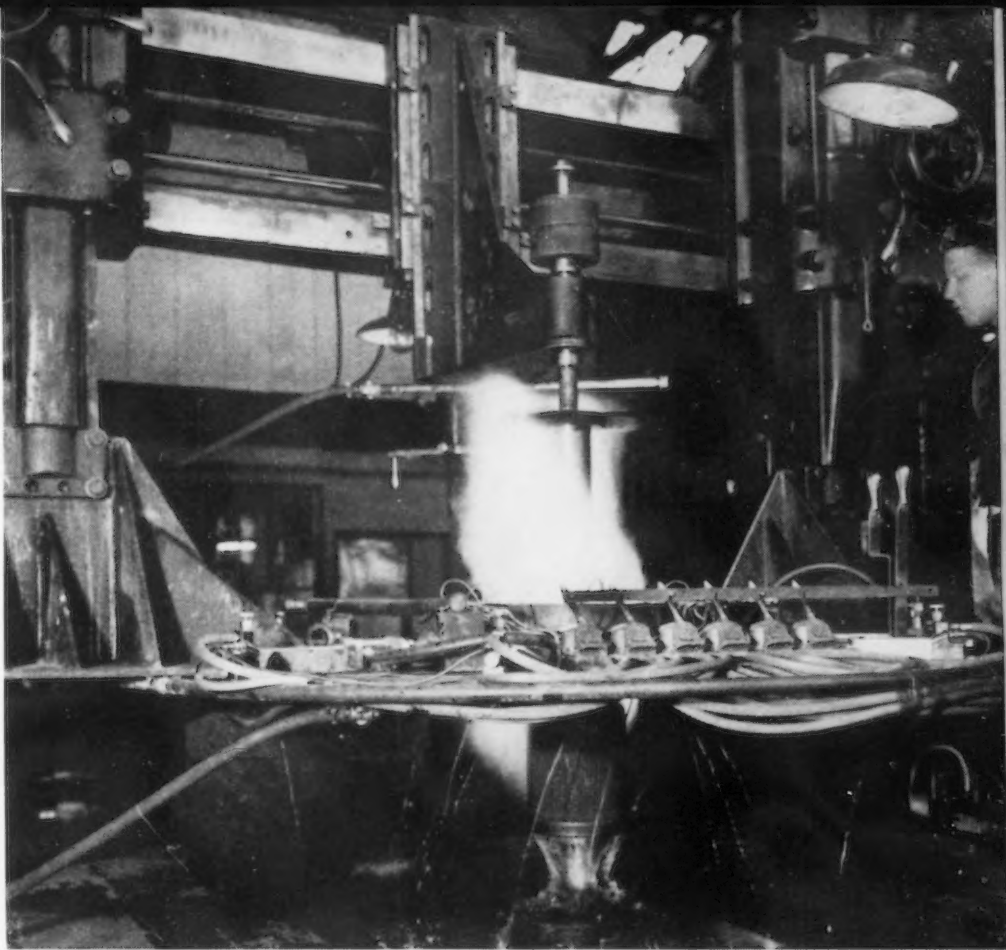
Heating is so rapid that traversing speeds of from 6 to 8 in. per min. are commonly used. Since the flame is of exceedingly high temperature (over 600 deg. F.) and impinges directly against the surface, the operator should have full control of the traversing speed during the operation to avoid melting or searing the surface of the metal. Much depends upon the skill and alertness of the operator and results depend largely upon his experience and training in detecting the proper color in the heated area for selection of speeds.

There is a zone of lower hardness which marks the boundary between two areas on the same surface when these areas are treated separately. This is unavoidable because the temperature gradient from the heated area causes the drawing of any previously hardened area, and this hardness

is not restored by quenching except where the temperature is above the critical. However, this drawn band or overlap can be held to a narrow width, usually under a half inch, and can often be positioned in such a way that it is not objectionable in service.

Attempts to harden rough casting surfaces have not been rewarded with satisfactory results. This is probably due to the fact that the oxide coating, commonly referred to as the skin of the casting, acts as an insulator against heat induction. However, it is usually desirable to machine surfaces which are to be flame hardened since this reduces the amount of subsequent grinding or eliminates it altogether, resulting in the increased depth of useful case. The uniformity necessary in the progressive hardening operation requires a surface accuracy of approximately $\frac{1}{64}$ in. Obviously, preliminary machining is required to obtain this accuracy.

Ed. Note:—Next week the author concludes this report with a description of hardening machines, notes on the characteristics of the hardened case on Meehanite, and technique for the minimization of distortion.



FLAME hardening of a roll by the vertical combination method in a vertical boring mill.



PICKLE POLISHED S

FOUR years ago a certain technical director of a certain large stainless steel mill boggled at the idea of electrolytic polishing of stainless steel. In the past eight months, this same technical director went through a probable \$30,000 in experimental effort to develop such a process, only today to find himself a Johnny-come-lately. To competition, that old dependable persuader which packs a particularly hard wallop in the sensitive stainless steel industry, must go the credit for the reversal in sentiment.

The question of letting the pickle tank take the place of, or supplement the buffing wheel—with quicker, cheaper and more dependable results in many instances—has been boiling beneath the surface of the industry for the past several years, but never quite foaming enough to break into print. Any recent visit to a number of stainless steel plants inevitably resulted in a laboratory sample being whisked from a locked drawer and proudly displayed with an accompanying farrago of technical and commercial patter. Equally inevitably the sample was a spot welded wire ice box shelf, one-half dark and discolored and the other half bright with the coruscation of an electrolytic polish. Just as equally inevitably, the description never got down to brass tacks as regards bath performance and degree of commercialization.

It is only proper that so many mills have so many ice box shelves in so many drawers. For, more stainless wire likely will be sold in 1940 for this one purpose alone than for any other single outlet. General Electric is introducing stainless shelves in its de-

lux '40 models. With about 10 lb. of stainless wire in each box, and with yearly production of all boxes of all makers at more than 2,500,000, a potential future market for 12,500 tons of stainless wire is indicated, which is a tidy bunch of steel in any sales manager's language—and of particular significance is that to electrolytic polishing goes the credit for opening this outlet. Additional new applications are evolving at the moment, as for instance small parts difficult to hold against a buffing wheel, intricate parts the recesses of which cannot be reached by a wheel, "gingerbread" fabrications that would tear a wheel apart, and rough forging and castings which now can easily be given the typical sheen of stainless. For that matter, new outlets, even now not envisaged, will likely follow the more widespread commercialization of this method of finishing stainless steel articles.

Stainless, polished in the conventional manner, requires quite a sojourn in the buffing department. First, there may be a polish with 100 grit, then 120 grit and grease, 180 grit with grease, and a final buff with 280 grit and grease to secure a mirror or commercial No. 8 finish. Throughout, there is danger of the wheels loading, the work scoring or burning, and flat surfaces warping. Such finishing can frequently be time consuming, be exasperating, because of the human element involved, and run up costs considerably. Numerous possible outlets for stainless can not carry such costs, and there are innumerable articles preferably made of stainless, which because of construction do not lend themselves readily to wheel polishing.

To polish electrolytically, an article

◦ ◦ ◦

COMMERCIAL units, licensed by Rustless Iron & Steel Corp., now are electrolytically polishing welded stainless steel wire products, such as those shown on these two pages. Note the typical high reflectivity.

◦ ◦ ◦

ED STAINLESS STEEL . . .

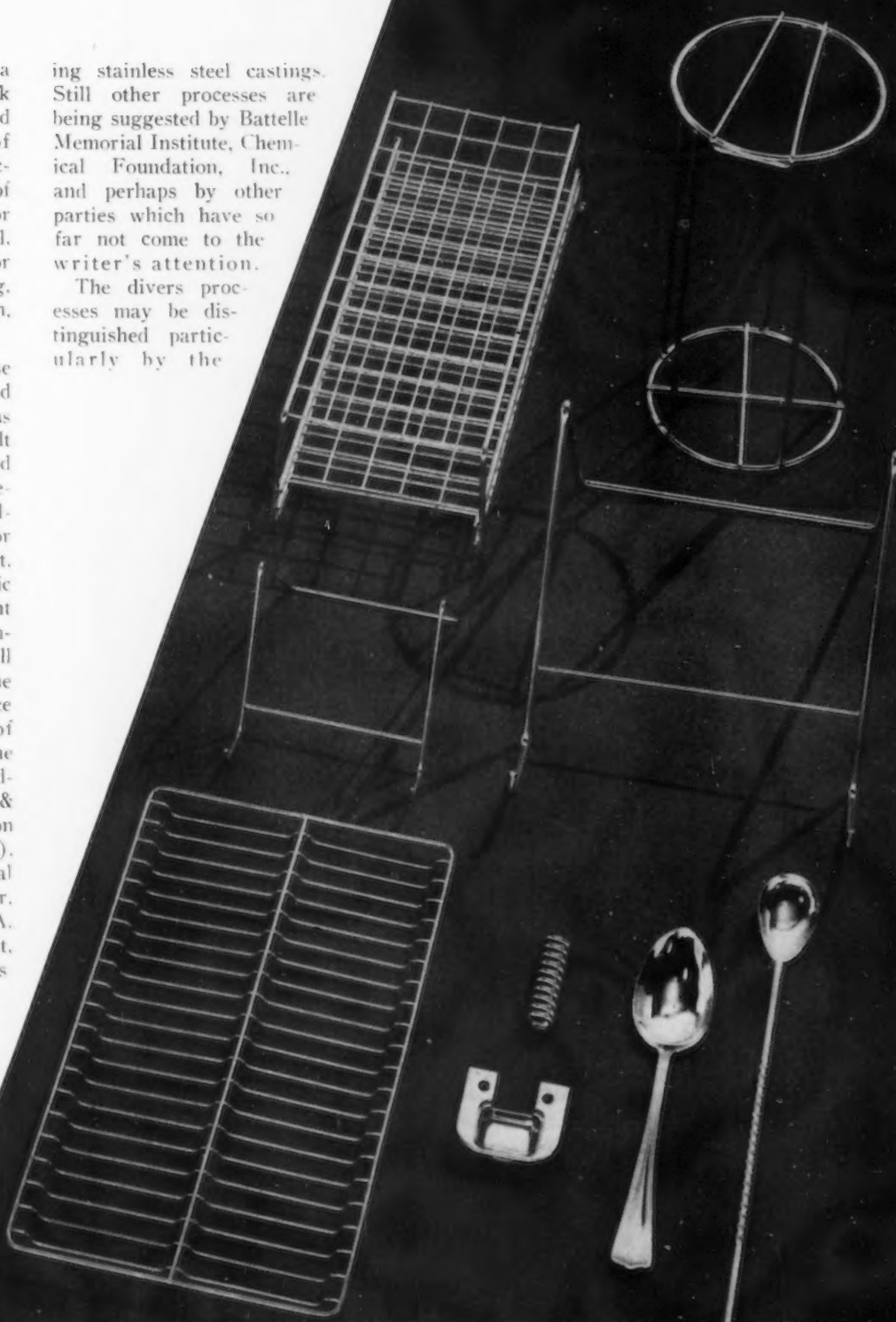
BY T.W. LIPPERT
Metallurgical Editor
THE IRON AGE

is immersed in what is essentially a reversed electroplating bath. The work to be polished is made the anode, and naturally a certain small amount of surface metal is removed. The electrolyte may be one of a number of varieties, some of which are superior to others as regards ease of control, absence of obnoxious, poisonous or explosive fumes, speed of polishing, cost of current, exhaustion of solution, and lucency of finish.

Electrolytic *pickling* is of course now a common industrial process and electrolytic *polishing* of metals such as tin, copper, aluminum, nickel, cobalt and certain alloys has been described briefly. (See International Tin Research and Development Council, bulletin No. 90, and *Metallurgist* for August, 1936, and April, 1938.) But, the electrolytic polishing (anodic treatment, pickle polishing, bright pickling), of stainless steel is completely new and in some instances still subject to considerable refinement. The first article describing such practice appeared in the Dec. 21, 1939, issue of *THE IRON AGE*, which set forth the process sponsored by Allegheny-Ludlum Steel Corp. The Rustless Iron & Steel Corp. has patent applications on another process (described herein), which process has two commercial units in operation since September, 1939, one at the plant of the L. A. Young Spring & Wire Co., Detroit, and the other at Wall Wire Products Co., Plymouth, Mich. Another process being merchandised under the direction of Sam Tour is operating at the plant of Philip Sievering, Inc., New York jobbing electroplaters, and at Cooper Alloys, Inc., Elizabeth, N. J., for treat-

ing stainless steel castings. Still other processes are being suggested by Battelle Memorial Institute, Chemical Foundation, Inc., and perhaps by other parties which have so far not come to the writer's attention.

The divers processes may be distinguished particularly by the



electrolytes used. Several patents have already been issued and a multitude of applications are pending. As for these latter, it is understandable that the parties involved are completely reticent as regards electrochemical characteristics.

This much is known, however. The Allegheny-Ludlum method, already mentioned, uses straight phosphoric acid, (a license from Western Electric Co.) although variations of this electrolyte are suspected but not known. The Rustless Iron & Steel Corp. employs a solution of concentrated citric and dilute sulphuric acids, and the American Rolling Mill Co. (associated with Rustless in this development work) has other types of electrolyte on file at the patent office, the characteristics of which are not known. Sam Tour's process involves a patent speci-

fying a concentrated sulphuric and hydrofluoric acid electrolyte, but other solutions containing no hydrofluoric acid are in the patent office, some of which are designed to polish metals other than stainless, as for instance nickel, brass and aluminum. What Battelle's solution is the writer does not know. A recent patent of the Chemical Foundation mentions an acid solution containing titanium tetrachloride, to impart a coruscant surface to stainless alloys. And, a recommendation has been made by P. Jacquet and P. Racquet (*Comptes Rendus*, March 27, 1939) of an acetic anhydride and perchloric acid solution for polishing stainless steel specimens for microscopic examination.

Obviously, therefore, there are a number of competitive solutions soon to confuse the many possible users of

this type of finishing technique. All claim highly lustrous surfaces, frequently with a certain degree of corrosion. Most of the solutions operate at about 2 to 6 amps. per sq. in.; most require comparatively close temperature control; and there is certainly considerable variation in bath additions, life and control, as well as health and explosion precautions. But these details naturally must await issuance of most of the patents before any clarification of these factors should be attempted.

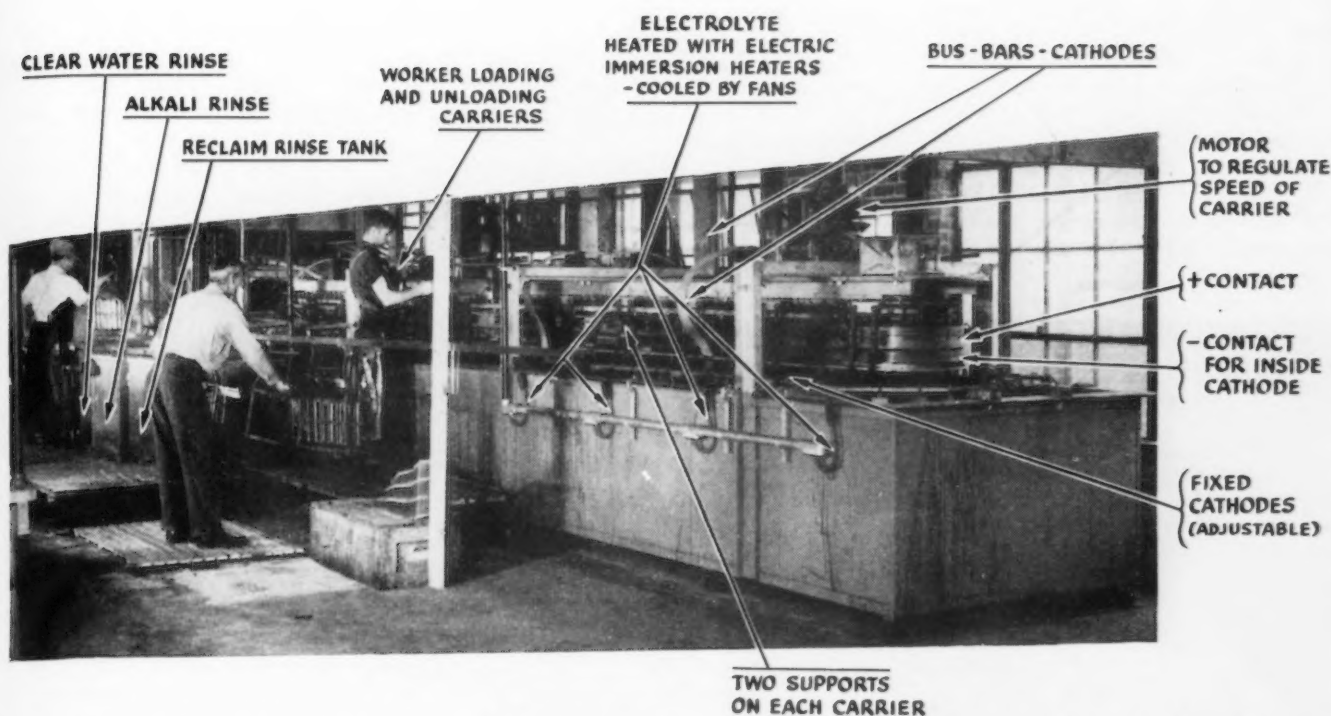
Installations by Rustless

Certainly one of the most energetic developers of pickle polishing of stainless steel has been Rustless Iron & Steel Corp., Baltimore, which company has collaborated with Armco over the past several years. Rustless' method is in commercial production on wire products particularly, whereas Armco has developed an alternative practice (designed for sheet and strip products) on which some additional data will be forthcoming in the near future.

The two large Rustless units, constructed with the active engineering cooperation of Hanson-Van Winkle-Munning Co., are now operating on regular production in the Detroit area at the plants of the L. A. Young Spring & Wire Co. and the Wall Wire Products Co., and were installed and placed in operation during September, 1939, following use of a smaller production unit which had operated about a year in the Detroit area. Each of the new installations is capable of electrolytically polishing 5000 stainless steel electric refrigerator shelves per day. As shown in the accompanying photograph, loading and unloading of the shelves is accomplished manually from a single position. The work rack is placed on a moving carrier and the articles under treatment travel around the tank and back to their starting positions under accurate speed control. The running time for a complete circuit of the tank is from 6 to 10 min., depending upon the shape and size of the refrigerator shelf, and there are 24 work carriers in the assembly. The solution is contained in a lead lined tank 33 x 5 x 3 ft. deep, and is heated to a comparatively high temperature by means of electrical immersion heaters. The most efficient temperature range is fairly narrow, but control of temperature in the commercial units has not constituted an operating problem. Direct current is supplied by means of a 7500 amp. 12 volt motor-generator set. Current density for most



THESE polished articles are shown as a demonstration of the versatility of the pickling method. Only the cooking pot (lower right) required a supplementary cathode. The refrigerator electric light cover (upper center) is commercially pickle polished—most of the other articles shown here will still be commercially wheel polished, for reasons such as cost, removal of scratches, etc. The articles as they come from the tank have the high finish shown.



THIS electrolytic polishing unit is in commercial operation in the Detroit area, for finishing refrigerator shelves. Running time for a complete circuit of the tank is from 6 to 10 min. This particular installation will polish about 5000 stainless steel shelves each working day.

work is of the order of 0.5 to 1.5 amp. per sq. in.

In addition to the two Detroit manufacturers, Rustless states that it has other licensees under its electrolytic polishing process, which is fully covered by patent applications. It is claimed that the electrolyte employed, which consists of a concentrated citric acid solution containing sulphuric acid, has many desirable characteristics, such as stability and long life and additions necessary only to balance drag-out, absence of noxious gases or fumes, freedom from undue corrosive action on the tank equipment, comparatively good "throwing power," and low cost of maintenance. In addition, it is further claimed that such operating variables as current density and time of treatment may be varied over a reasonably wide range without detriment or change in the character and brilliance of the polishing effect which is obtained.

According to Alexander L. Feild, director of chemical research of Rustless, the polished surface is characterized by a very high intrinsic brilliance. This brilliance characterizes not only surfaces which were initially flat or of uniform or gradually varying curvatures such as sheet, strip and wire, but likewise characterizes stainless steel castings and forgings which have been electrolytically "polished," in spite of

the fact that the castings or forgings still retain after treatment an irregular surface.

It is probably true that the difference between the stainless steel surface which has been subjected to ordinary pickling treatment and of electrolytically polished stainless steel surface is due to the fact that in the former case the surface absorbs by successive reflections within its microscopically jagged or matte surface a large proportion of incident light rays, whereas in the latter case a high percentage of the light which falls on the surface is reflected because of the absence of acute indentations or irregularities.

The manufacture of fabricated wire products generally involves welding operations, usually of the spot welding type. Welds are in fact essential in most articles of this type. It is an important feature of the Detroit area installations of Rustless' that the electrolytic polishing removes discoloration and oxide scale which is formed as a result of the spot welding operation. It will cut down burrs, fins and sharp corners, and, in addition, contributes a polish to the underlying stainless steel surface. From the standpoint of consumer acceptance, the importance of this latter fact cannot be overemphasized.

Rustless reports that its process has been used successfully in the electro-

lytic polishing of a variety of articles for the refrigeration and packing industries, including electric refrigerator shelves, meat savers, meat hooks, meat pins, meat molds and bacon hangers; in the household utensil field, frying baskets, percolator parts, pots, potato mashers, pancake turners, strainers, egg cookers, and many other items; in the cutlery field, knives, forks and spoons, as well as a variety of miscellaneous items such as bar shelves, bar spoons, wire baskets of various types and sizes, valve forgings, soap dishes, bathroom fixtures, screws, electric fan encasements springs, ventilators, test tube racks, hub caps, lens rims, windshield wiper parts, moldings, rings of various sizes, tubing, wire screen, instrument panels, ladle handles, castings, straight wires, etc. Some of these specimens, as herein illustrated, have an area of less than $\frac{1}{2}$ sq. in. while others may have 600 sq. in. or more of surface.

In experimentally polishing certain articles formed from sheet or strip, such as cooking pots and cups, it has been found necessary to use a cathode which conforms in a general way to the shape of the article in question. However, spoons, bathroom fixtures and other small shallow sheet articles require no special cathode. Also, such a special cathode has not been required in the polishing of fabricated

wire articles, even those articles that appear to be subject to severe problems of current distribution. So far as the writer knows, none of the electrolytes mentioned herein has a really excellent throwing power, which thus necessitates the use of supplementary cathodes for deeply recessed articles. Rustless electrolyte, for example, has been compared with chromium plating solu-

ically is definitely related to the condition of the surface to start with. The electrolytic treatment with its brilliant finish by contrast accentuates the visibility of metal defects such as pits, scratches, abrasions, etc., and actually serves as the best of inspection methods possible. Thus, frequently the electrochemical treatment can serve as preparation for mechanical polishing,



THIS stainless steel valve forging has been polished electrolytically. Note the typical brightness of the surface, even though still rough. Castings can be handled in the same manner, the result being a stainless-looking surface without going to unnecessary cost to remove the roughness.

tions as regards throwing power. However, this is an unfortunate comparison in that the former is an anodic throw whereas the latter is a cathodic throw. It is certainly true that many problems connected with throw into recessed articles are considerably relieved when taking off metal rather than putting metal on. And, some of the large ice box shelves are now being cleaned without supplementary cathodes, whereas chrome plating of the same shelf would hardly be attempted without extra anodes.

Pickling No Panacea

Although some of the statements made herein, perhaps, would carry the suggestion that polishing of stainless steel by mechanical means is doomed, such is definitely not the case. Electrolytic polishing is certainly no universal panacea—it is bound by definite limitations, at least so far. Rather, electrolytic polishing is complementary to mechanical polishing, in the writer's opinion, at least.

The final polish obtained electrolyt-

thereby shortening the entire finishing process considerably by permitting the operator to rapidly pick out defects. It is also quite likely that the removal of, say, 0.002 in. from a rough forging or casting will smooth the surface somewhat and remove some of the surface defects.

Starting with a good dense rolled surface (or drawn surface, as wire or rod), the articles coming from the bath will have a very bright specular finish. For articles with a rough surface, as for instance, castings, the electrolytic treatment of course brings out the intrinsic brightness of the stainless alloy, but the incident light is diffused and the finish is naturally not specular.

So far, no generalization as regards competitive costs on mechanical and electrolytic polishing is possible. Each has its own particular sphere of supremacy, and where these spheres overlap careful study would be necessary to show which should be used or what combination of the two should be employed.

For many articles, as for instance molding, which can be polished mechanically in automatic machines, the electrolytic method cannot compete as regards cost, one reason being that manual racking is involved. Successful experimental work has been done on bulk treatment of small articles such as screws, but it is doubtful if conventional barrel burnishing will be replaced to any large extent.

For drawn articles to be polished electrolytically, a careful study has to be made of the shape, location and cost of supplementary cathodes, the method of submersion to prevent masking by pocketed hydrogen, current distribution, etc., all of which runs up costs which would be liquidated only on long runs on many similar parts. Makers of drawn articles such as pots and pans have investigated electrolytic polishing but so far as the writer knows have not adopted the process. Rather, the preference is to retain mechanical polishing which in one operation removes scratches, etc., and gives a uniform appearance over the entire article. Electrolytic polishing would not remove the scratches, and there might well be differences in reflectivity between the flat portions and those portions where the grain had been coarsened by severe drawing action. Still another exasperating problem has been encountered—whether to close the bead or leave it open. If left open and then closed after electrolytic polishing, difficulty would be experienced with marring of the finish. If closed, the maker has to be positive the closure is tight. Otherwise, electrolyte will creep in and not be removed in the cleansing wash. To heaven would ring the loud cries of the housewife who later had such a pot which, after washing, drooled forth some goo that would etch a line down the side. This problem has not been satisfactorily solved, and when it is, quite likely equally exasperating problems will develop in other directions.

As regards incidental characteristics of electrolytic polishing, some solutions are stated by their sponsors as not directly affecting the corrosion resistant properties of stainless steel; that is, no passivating effect is produced. The Rustless and Armco processes, however, are claimed to be powerfully passivating in action, and although the complete theoretical background for such action is not known, the result may well be due to the anodic action which is powerfully oxidizing, from the nascent oxygen that is liberated.

Sintering of ALNICO

By G. H. HOWE

*Research Laboratory, General
Electric Co.*

ALNICO, the magnetic alloy which over the past few years has enjoyed a rapidly increasing commercial acceptance, has always been cast to shape. Because of the hardness of the metal any finishing or machining operations have been most difficult. Now, Alnico is being sintered to shape, with dimensions held to very close limits. How this is done and what results are obtained are herein described for the first time.

POWDER metallurgy, distinguished by many unique characteristics, has been used to great advantage in several applications which have grown to be of considerable industrial importance. Three outstanding examples are ductile tungsten, culminating efforts in the search for a durable and efficient lamp filament; so-called oilless bearings; and hard cemented carbide tool materials.

Sintering tungsten powder circumvented the problem of melting and pouring a metal above 6100 deg. F. Powder metallurgy furnished a method for attaining a self-lubricating porous, copper-tin alloy, having an even distribution of graphite particles, which could be readily sized in a press without expensive machining.

Today the application of powder metallurgy to the manufacture of permanent magnets of the Alnico type, similar to those made in the form of castings by several General Electric Co. licensees, has become established on a basis which assures future development and success.

The adaptation of sintering to Alnico is unique in that it broadens the field of magnet application through the production of magnets too small and intricate in shape to be cast satisfactorily or economically. Sintered Alnico competes with castings where greater physical strength is desirable, where a higher uniformity of flux distribution is required, and in applications where the smoothness and accuracy of size minimize or eliminate a grinding operation.

Aluminum Complicates Sintering

Alnico may contain 9 to 13 per cent aluminum in addition to nickel, cobalt, copper and iron. If it were not for the aluminum content, sintering might be a simple matter, but this element has such a great affinity for oxygen that it is readily converted to an inert oxide, not reducible by hydrogen. When the particles of aluminum become oxidized, they are not free to enter into combination with the other metals. Many attempts were made to include appreciable quantities of alu-

minum in hydrogen sintered alloys, but the conversion of aluminum to the oxide alumina occurred before the aluminum could alloy with the other metal particles. In many instances the formation of alumina caused the pressed bars to increase in volume. The conception that aluminum dissolved in one of the other Alnico constituents would be less subject to oxidizing influences led to trying several alloys. The most practical of these was 50 per cent ferro-aluminum which is very brittle and readily disintegrates into a fine powder. The combination of this alloy powder with the other powders produced the first sintered magnet having properties comparable with those of cast Alnico.

Hydrogen Purification

Another important feature in the early stages of the development of sintered Alnico was that a large quantity of pure dry hydrogen was necessary. The laboratory means for removing traces of oxygen from hydrogen at that time was to pass the gas over crushed ferro-silicon heated to 1650 deg. F. With freshly exposed surfaces, that method is efficient and useful on a small scale, but extended use diminishes the useful surface of the silicon to an ineffective amount. It has been known for some time that oxygen can be removed from hy-

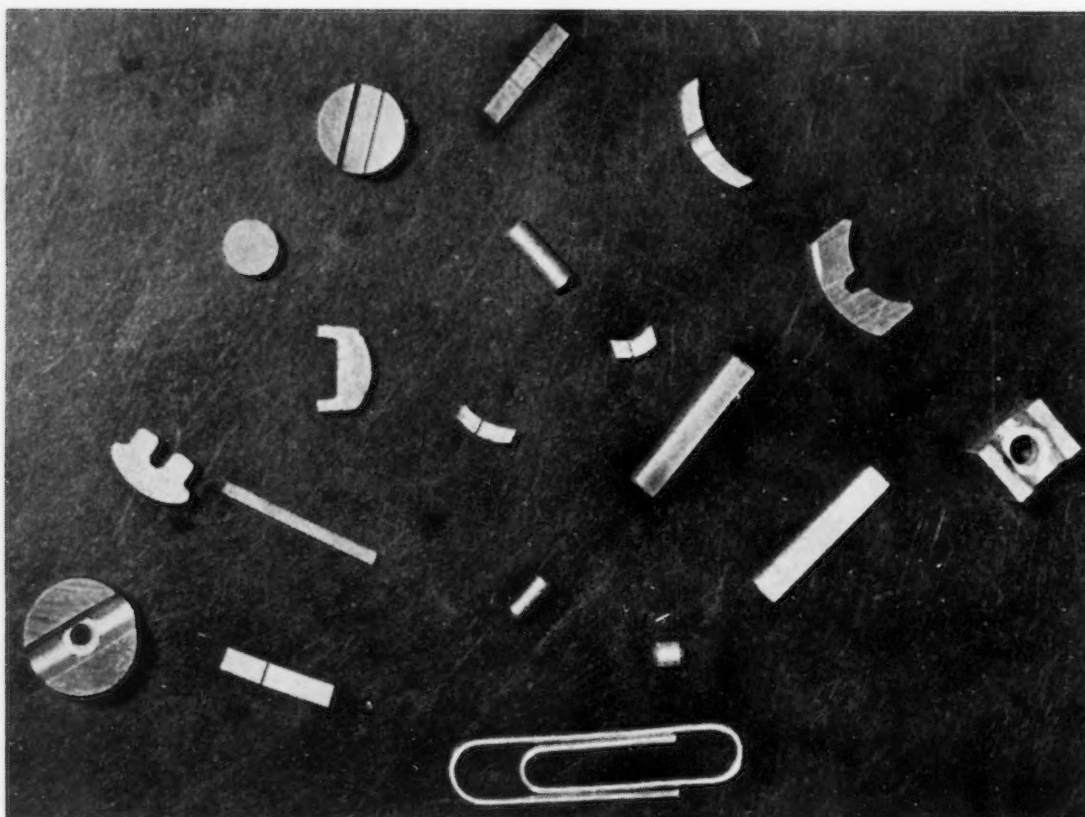


FIG. 1—A group of articles sintered of Alnico, the smallest weighing 1/224 oz. and the largest 1/5 oz. The paper clip is included to show relative size.

drogen by passing it over hot copper. The copper acts as a catalyzer converting the oxygen to water which can be absorbed by a drying agent. It was found possible to use an elaboration of this method for producing the continuous supply of dry hydrogen necessary for successful sintering.

Regardless of the purity of the hydrogen, no real advantage will be derived unless the hydrogen is used in an enclosure where purity is maintained. To avoid contamination of the gas, a rectangular iron sintering box was first used. Pure dry hydrogen was fed into one end through a tube, the other end being tightly fitted with a plug having an opening large enough to allow escape of hydrogen from the container at a slight positive pressure. Such a container was loaded and introduced into a hydrogen furnace for the sintering operation. After the sintering, the container was partially cooled in the furnace and then removed from the furnace to hasten cooling. The load inside the container was under the protection of hydrogen during cooling. Magnets sintered by this method cooled too slowly to impart a metallurgical state suitable for good permanent magnets—therefore, the magnets had to be reheated and cooled at a controlled rate.

To facilitate the most difficult processing step, that of sintering, and

to make the production of sintered Alnico commercially feasible, a furnace was devised through which pressed magnet preforms could be fed continuously. The desirability of such a furnace became apparent in the very early stage of production when difficulty was experienced in getting uniform sintering of each piece over the entire length of the load, which was at that time stationary during the sintering and, therefore, subject to inequalities in temperature.

This was an acute problem because the sintering temperature is close to the melting point of the alloy. Also, putting large masses of cold material into a furnace of this type sets up a thermal shock which, when repeated several times, is destructive to the refractory and heating unit, which further contributes to a condition of uneven heat distribution. By passing continuously through a furnace, the effect of any temperature gradients in the hot zone is nullified because each magnet, regardless of position on a boat, passes through the entire length of the hot zone and all magnets receive exactly the same sintering treatment.

Boat Construction

At the sintering temperature of the alloy iron, surfaces in a hydrogen reducing atmosphere are in an ideal condition for sticking together. Some

materials used for boats, as for example cold rolled steel (0.20 per cent C), may contain slag which will stew out and come in contact with the sintering tube bottom. Such slag seriously interferes with the progress of boats through the furnace even though the tube is dusted with alumina. Rolled boat materials sometimes swell over sizable areas because of an internal gas pressure developed by the reduction of oxide in a seam. Any one of these conditions is a hazard in the furnace operation and may cause an appreciable loss of production time. It was apparent that in operating one of these continuous furnaces there would be trouble in keeping the sintering chamber bottom sufficiently covered with alumina to prevent sticking and consequent buckling of the hot loaded boats.

A boat with a greatly reduced tendency to stick at high temperature in hydrogen was made by pressing composite slabs from high purity iron powder and iron powder containing alumina, the latter forming the welding resistant surface. After sintering in hydrogen of ordinary purity, these slabs were fabricated into boats by welding on the straight iron sides. End pieces against which pushing is done were cut from sintered slabs and welded on so abutting surfaces are faced with the protected side. This

type of boat has been used with excellent results and no particular attention has been paid to periodic replenishment of alumina dust on the tube bottom. The boats tend to become warped after prolonged use, but they may be straightened cold in a vise or hydraulic press without damage.

Iron-Alumina Boat

Another useful type of boat is made completely of an iron-alumina mixture which may be pressed thick enough so that the middle can be machined out to form a shallow box. This iron-

est 1/5 oz. Fig. 2 shows larger magnets formed in automatic mechanical and hydraulic presses.

Alnico is not readily machineable in the final sintered condition. In the "as pressed" condition it is too fragile for machining, but strong enough for ordinary handling.

To satisfy requests for experimental samples in cases where mold expense is not justified, pressed bars are partially sintered in a hydrogen furnace and pushed directly into a water-jacketed cooling chamber. In this partially sintered condition, bars can be

they cool at a rate which gives the optimum magnetic quality. Proper cooling is desirable as subsequent magnetic quality depends largely upon the state of dispersion of the inter-metallic compound NiAl. An additional aid in this direction is obtained by making a modification in composition. The incorporation of final heat treatment in the sintering furnace operation leaves only pole face grinding, magnetizing and checking to be done. The latter two operations are now being done automatically in one large scale application. At the present stage of development, the economics in general seem to be in favor of the sintered product over the cast for magnets weighing 0.1 lb. or less.

The term sintering as applied to Alnico might well be defined as the thorough inter-diffusion of four or five metal powder constituents into a complex alloy comparable with a casting in physical density. The sintered magnets are fine-grained and, therefore, have a much higher physical strength than the cast product [5 to 9 times greater respectively in transverse and tensile tests]. The photomicrographs in Fig. 4 show the grain size contrast in Alnico made by sintering and melting. The same permanent magnet quality of cast Alnico is present in the sintered product. This includes the highest amount of stored energy per unit volume of any permanent magnet material produced commercially today and high resistance to demagnetization due to stray fields, vibration and heating.

Bars of sintered Alnico are inherently physically and magnetically homogeneous throughout and are used as standard reference test specimens for General Electric Co., Alnico licensees, and for comparative tests with the Bureau of Standards. They serve the important function of getting accurate comparative magnetic measurements on the different permeameters which do not test the same section. They have no consequent poles and are sufficiently strong mechanically to withstand breakage by accidents occasionally encountered in handling and shipping. Magnetic properties on two representative standard bar specimens are recorded in Table 1.

Solder Used in Mounting

In some applications it is desirable to mount magnets in apparatus by means other than clamping. Overheating during low temperature brazing with fluxes and alloys sometimes has caused magnet spoilage. When this

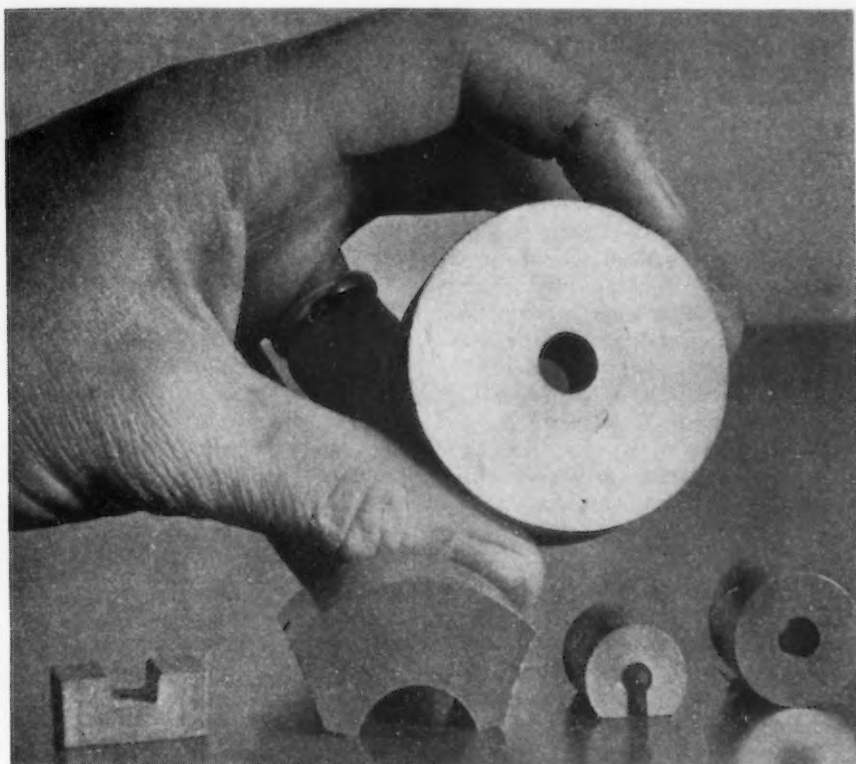


FIG. 2—Sintered Alnico magnets of a larger type, formed in automatic mechanical and hydraulic presses.

alumina boat is refractory and when badly warped, must be discarded.

With the exception of the ferro-aluminum, the other constituents of Alnico are purchased as manufactured powders. Most sintered magnets are small in size and can be formed economically and well in tablet making machines.

The magnet preforms pressed on these machines are loaded on boats and fed into a continuous furnace for progress through the hot zone and into the extension for controlled cooling. A collection of magnets representative of current production is shown in Fig. 1, compared with an ordinary steel paper clip for size. The smallest weighs 1/224 oz. and the larg-

easily machined. Parts shaped in this way are just as good magnetically after the final sintering as the bars sintered in the regular way. As an example of this process, Fig. 3 shows the sequence of operations in forming a magnet from a disk pressed in a stock mold.

The material cost for sintered Alnico at present is greater than that for the cast product. Some of this difference is undoubtedly made up by the elimination of the scrap loss which occurs in the casting process. However, other economies are desirable to make the cost of sintered magnets more attractive. A big step in this direction has been accomplished by controlling the cooling rate of the magnets so that

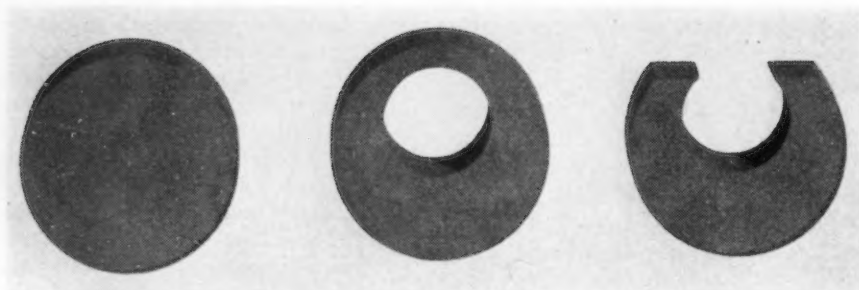


FIG. 3—In a partially sintered condition Alnico can be machined, after which a final sintering is carried out.

occurs, a solution heat treatment followed by the proper cooling rate to restore the desired metallurgical structure is necessary. Welding develops a large grain size locally and imparts extreme local brittleness. Since the proper cooling rate is incorporated in the sintering cycle, it is desirable to use a joining method that does not affect either the physical or magnetic strength. Experimental work with this objective in mind showed that a strong joint could be made with soft solder and the usual zinc chloride solution flux after the aluminum has been removed from the surface by etching.

Soft soldering has no detrimental effect on Alnico and has been used with good results, particularly in experimental assemblies. It is the simplest method of attachment and affords a means of fabrication preferable to the cutting down of a cross section which sometimes occurs with bolting or clamping. Also bolted or clamped assemblies are sometimes

loosened by vibration. Soldering was invaluable in the construction of an assembly designed to demonstrate the possibilities of high holding ratios. An early design resulted in a lifting ratio in excess of 4400 to 1, the object held weighed 69 lb. and the magnet, $\frac{1}{4}$ oz. Differing from usual magnetic circuits, this new high ratio unit consists of an assembly of several parts, including a sintered Alnico magnet. When joined together, they form a unit containing a segmented shunt. By this method leakage is very low and the magneto-motive force is utilized so efficiently that proportionately greater loads may be held by increasing the amount of Alnico used. Hitherto holding ratio has not increased directly in proportion to magnet size, due to metallurgical non-homogeneity and the greater internal reluctance.

To avoid any misunderstanding, it should be stated that this kind of holding magnet assembly is not intended for miscellaneous use, nor is it ex-

pected to be competitive with the large so-called lifting electromagnets in use today for car loading and unloading. Primarily, it demonstrates that the greater energy in Alnico can be used to utmost advantage and makes possible the expansion of permanent magnet applications.

Pole Faces Attached by Soldering

Iron pole faces can be attached by soft soldering to both sintered and cast Alnico for the purpose of collecting flux and concentrating it in small air gaps.

It is also possible to form iron faces integral with magnets during sintering. This is done by depositing a layer of iron powder on top of the Alnico mixture in the mold or die prior to pressing. During the sintering operation both layers sinter and bond together. An iron backing of appreciable thickness similarly applied may be drilled and tapped or spot welded. In the use of this method of attachment the magnetic path must be one in which partial shunting will not occur.

Iron pins or sleeves may be securely anchored in sintered magnets by insertion in the pressed mixture. During sintering Alnico shrinks (6 to 12 per cent, depending upon pressure) and holds inserts tightly. Insert diameters should be small with respect to the surrounding mass to avoid the extreme strain and distortion which cause unsound magnets.

Alnico has made available a permanent magnet of greatly improved char-

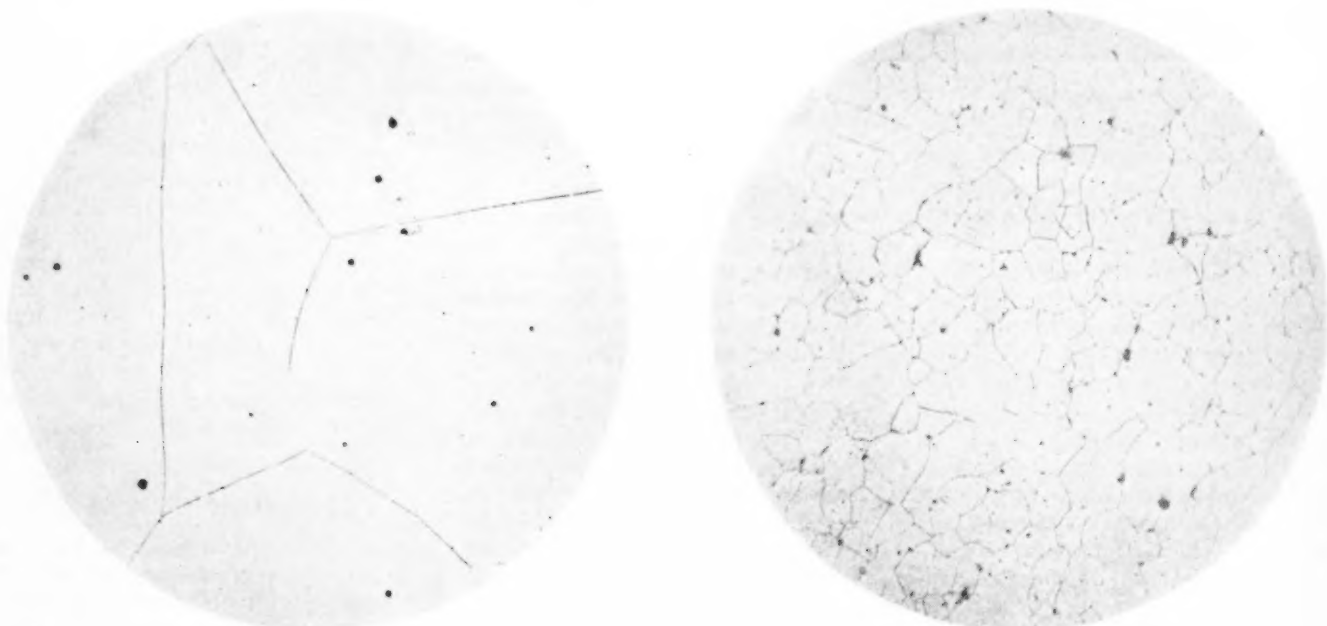


FIG. 4—Grain size contrast in Alnico made by melting (left) and by sintering (right). Both views at 250 diameters.

acteristics at a reduced cost. It has greatly increased the number of applications for the use of an independent and constant source of magneto-motive force through substitution for electromagnets, and it has made possible new applications of small light-weight magnets of high physical and magnetic strength. And, the limitations imposed by the lack of ductility and machineability of cast Alnico have become less important with the development of the sintering process. Both cast and sintered Alnico have definite economic places in industry, but pressing and sintering close to size have minimized finishing operations. What finishing is necessary can be done rapidly by grinding without danger of breakage or incipient surface cracks.

The extent of any commercial substitution of sintering for casting will depend upon future metal powder costs, further simplification of techni-

	Magne- tizing Force, Oersteds, H _{max}	Induc- tion, Gauss, B _{max}	Coercive Force, Oersteds	Residual Induc- tion, Gauss	Energy Product (BaH _a)	at B =
Alnico I	2000	12,375	420	7400	1,400,000	4900
Alnico II	2000	12,800	528	7610	1,650,000	4650

cal problems and improvements in processing gained by production experience.

For information regarding the theory of permanent magnets, the reader is referred to the following:

"Permanent Magnets in Theory and Practice," by S. Evershed, Journal I.E.E., vol. 58, No. 295, September, 1920, p. 788 to 827.

"Magnet Steels and Permanent Magnets," by K. L. Scott, A.I.E.E. Trans., vol. 51, No. 2, June, 1932, p. 410 to 417. Also A.S.M. Metals Handbook, 1939 edition.

"Some Principles Governing the Choice and Utilization of Permanent Magnet Steels," by R. L. Sanford, Bureau of Standards Scientific Paper No. 567.

"Permanent Magnets," by R. F. Edgar, General Electric Review, vol. 38, No. 10, October, 1935, p. 466 to 469.

Low Temperature Joining of Sheet Metal

TWO new methods of joining sheet metal parts in the form of a low temperature soldering operation have recently been announced. Both use pastes, one in combination with a rod. The so-called Colaweld "Atomic" welding paste is simply brushed onto the metal at the points where joining is to take place, rod applied, then subjected to heating at about 450 deg. F. In a matter of a minute, the bond is completed. It is claimed that the lighter the gage of the metal, the faster the action, and the stronger the band. The range in gages is from 0.005 to 0.050 in., and the method is applicable to all non-ferrous metals, particularly to aluminum alloys; also to carbon steels and stainless steels. The material is made in liquid form for similar application on a production basis, according to the maker, the Colonial Alloys Co., E. Somerset and Trenton Avenues, Philadelphia.

Meltomatic paste solder is the name given a new self-cleaning and self-fluxing paste solder being marketed by Wayne Chemical Products Co., Detroit. The paste is brushed on the metal where needed (see accompany-

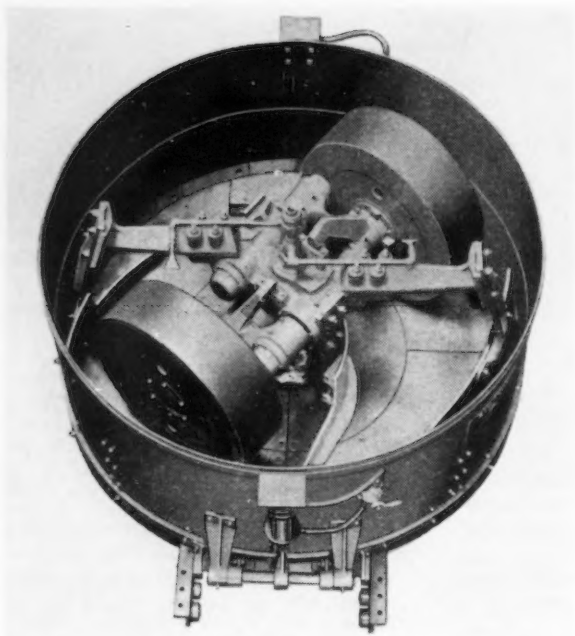
ing illustration) and heat applied to the parts being joined, either with gas or other flame, electricity, hot oil or in the furnace. The paste melts at a temperature slightly higher than 400 deg. F. Because of simplicity of operation and the absence of prior cleaning, substantial reductions in labor costs over conventional soldering operations are claimed. Material waste is lessened also, since there is no excess solder to melt and drop off. Only

enough paste is used to cover the area to be bonded.

Meltomatic is said to facilitate soldering of small articles where irons are difficult to manipulate, and it permits the operator to reach small spaces not accessible with ordinary solder stock. It also permits the simultaneous soldering of several articles or units. One unconventional application has been to the attachment of nameplates to motor blocks.

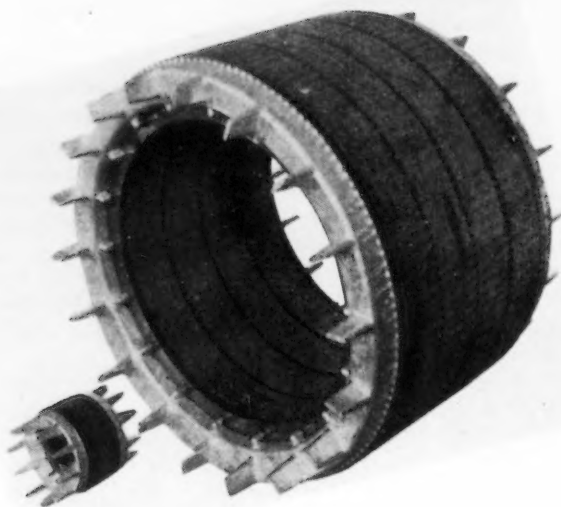


What's



IN approximately 2 min. a 5000-lb. batch of foundry molding sand can be prepared in this No. 3½ size Simpson mixer, the largest machine ever built by National Engineering Co., Chicago. This mill is 9 ft. 3 in. in diameter and weighs 35,000 lb. The mullers weigh 5500 lb. each, and the drive is by a 60-hp. motor.

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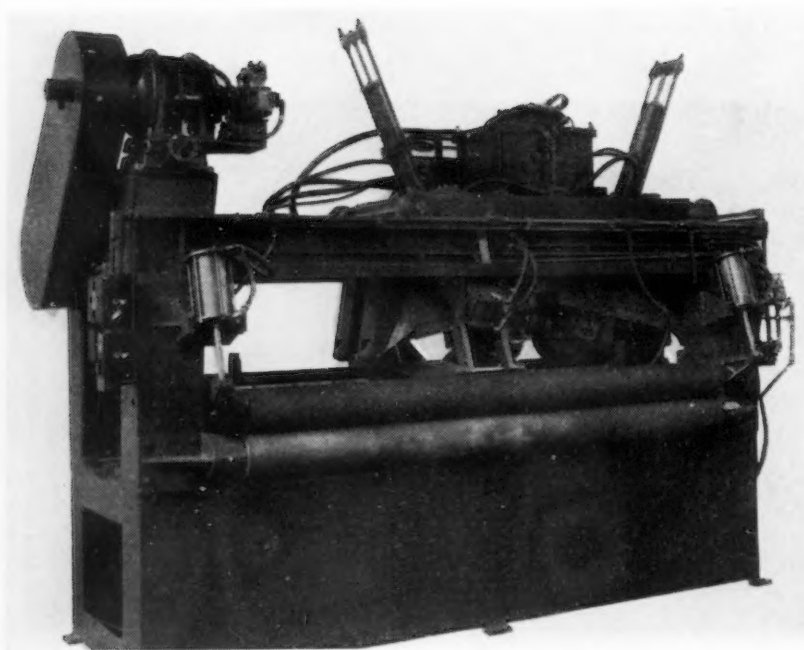
ABOVE

THE first aluminum pressure-cast rotors made by Reliance Electric & Engineering Co., Cleveland, in 1931 had an outside diameter of 10½ in. The larger rotor shown here is 20 in. in diameter, and indicates the advance in casting technique since 1931. The increase in size has been made possible by preheating of the core to around 600 deg. F. before casting, the use of increased casting pressures, and the speeding up of the casting press.

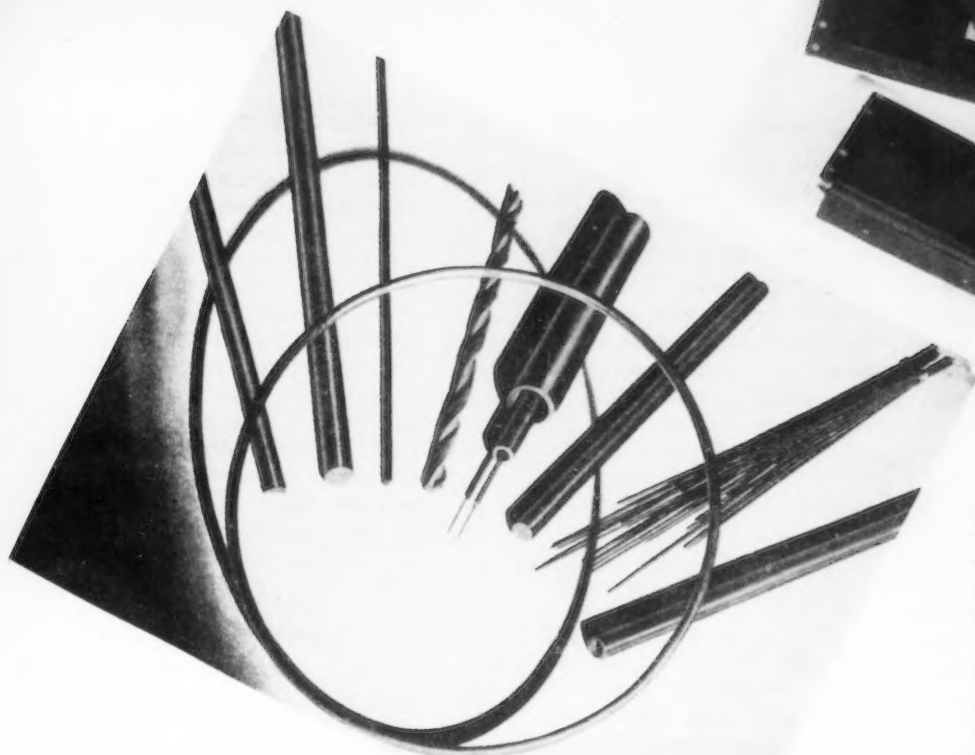
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AT LEFT

CONTINUOUS processing of aluminum strip is facilitated through a roll type cross seam welder built by Federal Machine & Welder Co., Warren, Ohio, for welding the ends of successive aluminum strips together. This machine makes two welds at once in series. Aluminum alloys 24-ST and 52-ST are handled, maximum width being 104 in. and minimum width 30 in., while thicknesses range from a minimum of 0.008 to 0.08 in. maximum.



New!

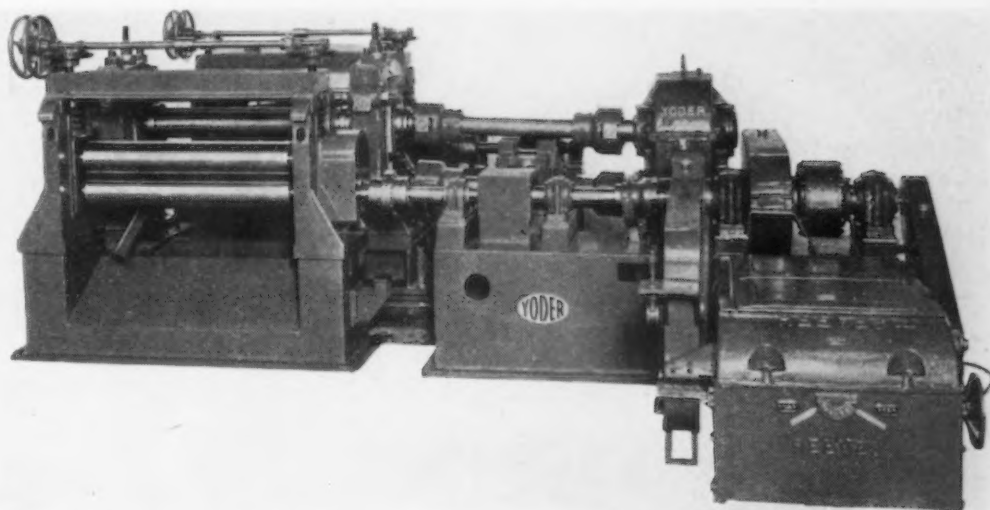


ABOVE

CEMENTED carbide is now available in the form of tubing, spirals, and round or shaped bars, according to the Carboloy Co., Inc., Detroit. Produced by means of an extrusion process, these products are considered a distinct innovation compared with previous practice. Formerly such parts were available only within an extremely limited size range and it was necessary to perform a large part of the shaping operation manually. With the new process, the parts are available in lengths up to 20 in. and within a diameter range of from 0.015 to $\frac{3}{8}$ in. O.D.

AT RIGHT

NEW type of steel mill slitter developed by the Yoder Co., Cleveland. The speed of the pull-out tension rolls is synchronized with the speed of the cutters. Reeves variable speed transmissions play an important role in the operation, and the slitter is said to be free from slippage either through the rolls or cutters. The first unit recently installed in an Ohio River steel plant operated at a speed of 275 to 300 ft. per min.



ABOVE

ST. JOHN X-RAY SERVICE, INC., has announced an "economy cassette" for X-ray technicians. The main feature of this cassette (shown here) is the fact that it always remains on the job. The only thing that has to be carried back to the darkroom for re-loading are flexible film folders. Another feature visible in the photograph are interchangeable filter set fronts. These filter sets can be chosen in accordance with the voltage employed and the thickness of the metal to be penetrated.

o o o

BRAZING ALUMINUM

BRAZING of aluminum alloys, particularly batch brazing by the furnace method, is too new to afford extensive application data. But the basic principles have been established, and these are outlined by Mr. Hoglund in this article, which is from his paper at the recent 20th annual meeting of the Amer-

ican Welding Society. The brazing processes described should reduce joining costs as compared with standard gas and arc welding methods, Mr. Hoglund states. They also provide joints that require less finishing, and extend the welding to parts thinner than heretofore possible.

o o o

BRAZING methods for joining parts made from the aluminum alloys have been developed and the process has been used successfully on several commercial applications.

In general, these brazing methods involve the use of filler material with a lower melting point than the parent material, together with fluxes which melt at the brazing temperature and permit the filler material to wet the surface of the joint. Brazing the aluminum alloys differs from welding primarily in that no substantial amount of the parent material is melted. As the technique involved is of comparatively recent origin, all possibilities of the general process have not been explored, but experience to date indicates that there are three general methods of application.

These methods are furnace brazing, dip brazing and torch brazing. In the first, the parts are assembled, fluxed and brought to a temperature above the melting point of the filler material but below that of the parent material. The cost reduction possibilities of this method over gas welding are apparent when it is considered that

the number of parts or the number of joints on any one part are limited only by furnace size.

Dip brazing is accomplished by assembling the parts in jigs to maintain proper mating of faying surfaces and applying brazing heat by dipping the assembly in molten flux, held at a temperature that will wet the surface of the parent parts and permit the filler material to flow into the joint.

Torch brazing needs no extended description as this method resembles very much the conventional gas-welding process, except that a filler material of low melting point is used with a special brazing flux so that little or no melting occurs in the parent material.

Alloys That Can Be Brazed

The details of the brazing process have not yet been worked out for all the aluminum alloys. However, a representative group of alloys, ranging in mechanical properties from those of commercially pure aluminum to those of the heat-treated alloys commonly

used for welded parts can be brazed by the above methods. These alloys include commercially pure aluminum (2S) and material of higher purity, an aluminum-manganese alloy (3S), an aluminum-manganese-magnesium alloy (4S), and an aluminum-silicon, magnesium-chromium alloy (61S). The latter alloy is a heat-treated material and brazed joints in this alloy have shown the highest tensile strengths. Choice of the proper alloy for a specific part will depend on the design of the parts to be brazed and will be based on the relative cost, strength, ease of forming these materials, rather than on the brazing properties.

Strength of Brazed Joints

The strength of brazed joints in these alloys is about the same as the strength of torch-welded joints. A comparison of the values of the strength of furnace-brazed butt joints in 0.051 in. thick sheet is shown in Table 1, and is indicative of the range covered by these materials.

In this connection it should be noted that the temperature of the brazing operation is above the annealing temperature; consequently the parts are annealed by brazing. Furnace or dip-brazed parts of 3S or 4S alloys will return to the annealed temper regardless of the cold work in the parts initially from the forming or rolling operations. Alloy 61S, on the other hand, relies on a heat treatment operation to attain maximum strength. It is possible with some assemblies to quench the part in an air stream or in water to remove the brazing heat and at the same time develop substantially higher strength than if a slow cooling rate were used. A separate heat-treating operation after brazing can also be used when heat-treated properties are essential.

Filler Material and Flux

Successful application of brazing depends on the proper choice of filler materials and flux. Filler materials have been developed which melt and

Table 1—Typical Values of Strength of Furnace Brazed Butt Joints

Alloys	Tensile Strength (Lb. Per Sq. In.)	Yield Point (Lb. Per Sq. In.)	Elongation (Per Cent in 2 In.)
3S	15,000	9,000	7.0
4S	19,000	12,000	3.0
61S	34,000	30,000	3.0

ALLOY PARTS

By G. O. HOGLUND
*Welding Engineer, Aluminum Co. of
America, New Kensington, Pa.*

flow into the joint at a temperature far enough below that of the parent material to provide a practical brazing range. The brazing material may be applied as a wire or as a sheet washer in a manner similar to the methods used with other metals.

Because of the natural oxide coating present on all aluminum and aluminum alloy parts, it is not possible to wet the surface of the parent material unless a flux is used. A number of special brazing fluxes have been developed for this purpose which melt below the brazing temperatures and prepare the surfaces so that the brazing material will flow into the joint. These fluxes may be supplied in the form of finely ground powder and can be applied to the joint in a dry or wet state. The method of application will

depend on the type and number of parts, although to date either painting or spraying a mixture has been most economical.

Removing Residual Flux

After the brazing, it is important to remove residual brazing flux to improve the appearance of the part, as well as to prevent any possibility of corrosive attack which may take place when the flux adsorbs atmospheric moisture. Although the fluxes are soluble in water it is usually advisable to apply a more vigorous cleaning procedure. One method that has given good results consists of immersing the part in hot water for a period sufficient to remove the major portion of the flux. This is followed by a 45 to 60 sec. dip in 5 per cent sodium

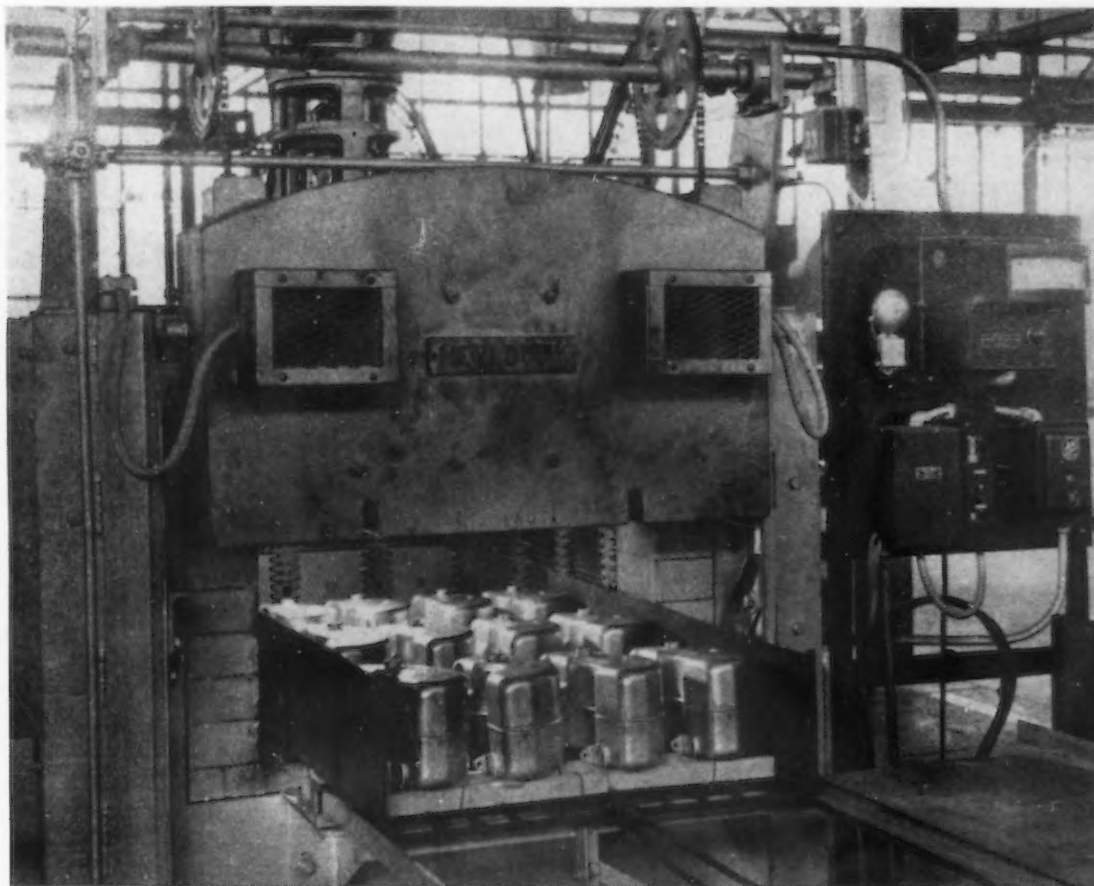
hydroxide held at 150 deg. F. This in turn is followed by a water rinse and a 1 to 2 min. dip in cold 50 per cent nitric acid. This acid is removed by a water rinse.

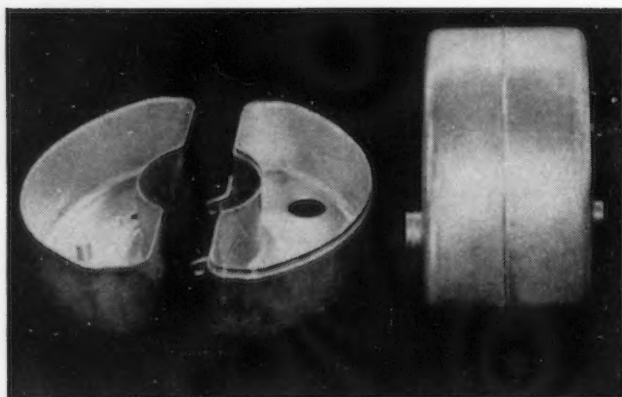
Cleaning of parts prior to the brazing operations is also frequently desirable. The type of cleaning will depend on the amount of dirt or forming lubricant present on the parts and it is usually sufficient to use some form of solvent cleaning. In some cases this will not adequately clean the surface, and an etching procedure similar to that described above is applied.

Furnace Equipment

Furnace equipment for brazing the aluminum alloys is essentially the same as that used for brazing other materials. The major difference is

BATCH furnace brazing of aluminum alloy gasoline tanks. As may be seen, this type of brazing lends itself to quantity production.





ALUMINUM alloy gasoline tank before and after assembly by brazing.

that the temperature range for brazing these alloys is lower than that for ferrous materials. A temperature range from 1000 to 1200 deg. F. is used on all applications now in production or being considered. Batch-type electric furnaces have been used in most cases, but there seems to be no valid reason why conveyor-type or gas-fired furnaces should not be equally satisfactory if the furnace is designed to operate in the above range. Temperature control of the order of plus or minus 10 deg. F. is essential to obtain consistent results.

No fumes or gases are formed during the brazing period which require ventilation to the outside air. When the fluxes are mixed with water to permit uniform spreading on the joints, a small amount of hydrogen may be evolved in the furnace. When brazing parts with open joints this has no effect, but when brazing closed assemblies, some means must be provided to permit egress of the gas. If this is not done ignition of the hydrogen may occur with sufficient violence to push the parts out of alinement.

All production brazing operations to date have been accomplished in an air atmosphere. Experimental work with the commonly used controlled atmosphere made by partial combustion of natural gas, coke oven gas, butane or propane, has not indicated any advantage in using this type of atmospheric control. Good results can be obtained with a pure hydrogen atmosphere, although it has not yet been necessary to use this gas in actual practice.

Temperature and Furnace Time

The load temperature and the time in the furnace for a specific part will depend on the alloy being brazed, the alloy of the filler material, the thickness and shape of the parts. With the brazing materials available at present, this temperature will be somewhere

between 1050 and 1185 deg. F. The time in the furnace will depend on the time necessary to get the load up to the brazing temperature. This is followed by a brazing period of 3 to 8 min. The effect of the thickness of the part on the furnace time is shown by the fact that parts made from brazing sheet 0.008 in. thick have been brazed in 4 min., while heavier parts

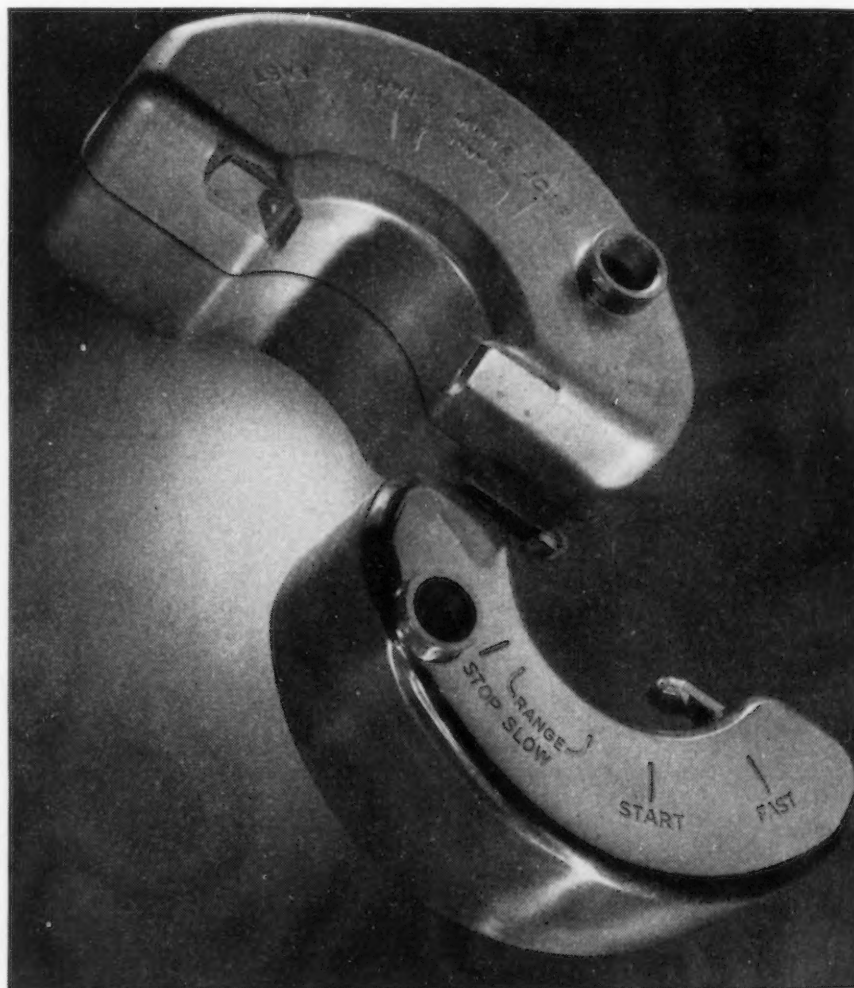
$\frac{3}{8}$ -in. thick have required a furnace time of 45 min.

Jigs and Fixtures

Jigs and fixtures to maintain alinement of the parts can be used if the difference in thermal expansion between the aluminum parts and the material used for the jigs is recognized. If steel or stainless steel jigs are used, the design should be such that the difference in expansion which will occur between the aluminum and the steel jig will not distort the aluminum part or push it out of alinement. The same applies to graphite jigs. Brass or copper jigs are usually not suitable as these metals will alloy rapidly with the aluminum at the brazing temperatures if contact is made between the brass or copper and aluminum in the presence of molten brazing flux.

In view of the time lost in bringing the jigs and fixtures up to the brazing

(CONTINUED ON PAGE 59)



BRAZED joints can be polished to give an attractive appearance. The upper of these aluminum alloy outboard motor gasoline tanks has been cleaned after removal from the brazing furnace; the lower tank has been given a finish.

NEW POWER TRANSMISSION EQUIPMENT

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

VARIABLE speed drives still provide a fertile field for the inventor. Several new types are described, including an electromagnetic unit that for speed control depends upon governing the amount of slip between driver and driven member. A number of new designs in geared motors have appeared on the market in recent months, and there has been an extension in the range of worm

gear reducers in the smaller sizes. Protection against overload is afforded by new types of slip clutches, also by a planetary drive with built-in torque limit feature. Improvements in V-belt and chain drives are described in this review, as well as new types of sealed ball bearing units. Oilproof neoprene belts are offered for machine shop use for the first time.

hangar bolts. Available as accessories with the basic units are a group of standardized reduction drives to still further increase load capacity of the units.

The wide range of infinitely variable speeds is due to the combined use of a standard variable speed transmission driven by the motor and in turn driving a conventional speed reducer. This gearing increases the available speed range and permits reversing the direction of rotation or even the stopping of the output shaft without interfering with the operation of the drive motor. Anti-friction bearings are lubricated by means of a two-point, high pressure lubrication system. The system of gearing as well as the additional reduction gears run in a bath of oil. A speed indicator is mounted on the outside of the case near the speed control handle. Remote control by either mechanical or electrical means is also available as is a control for synchronizing speeds of two or more units.

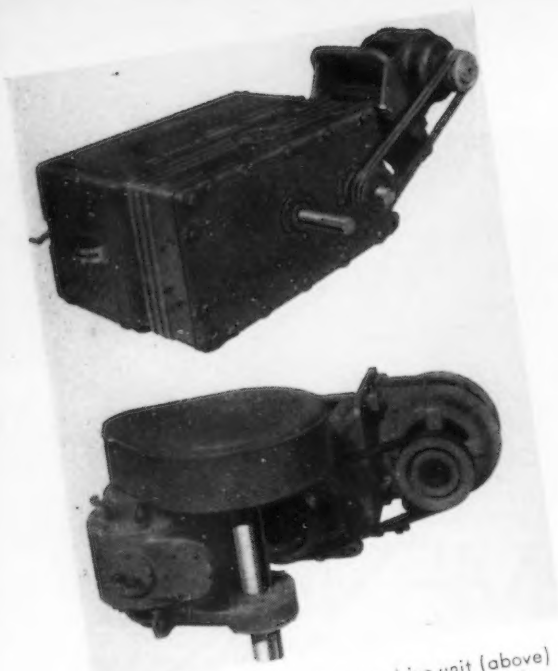
Magnetic Variable Speed Drive

A NOVEL variable speed drive system using electromagnetic principles for torque transmission has been developed by the *Electric Machinery Mfg. Co.*, Minneapolis. The magnetic

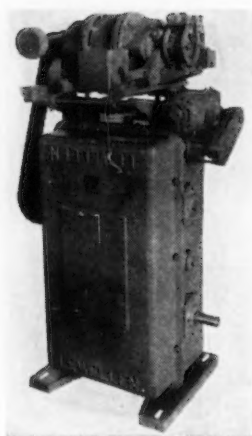
DEVELOPMENT of a new type of infinitely variable speed drive unit with larger capacity and wider range of speed than previously available is announced by *Mechanical Handling Systems, Inc.*, 4700 Nancy Avenue, Detroit. Its flexibility of application is expected to eliminate much of the special engineering previously necessary in obtaining large torque capacities and low speeds when conventional variable speed drives are used. With capacities up to 80,000 in.-lb. torque and infinitely variable speed ranges of from 310 r.p.m. forward to 9 r.p.m. in reverse (with any

standard 1 to 10-hp. motor), the new drive unit is available either for right or left-hand installation and with either vertical or horizontal output shafts.

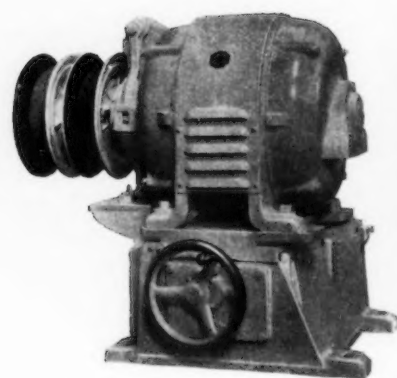
Two basic units, identical in design except capacity, are furnished. In the larger capacities, the output shaft is vertical and may be had either upward or downward, short or extended style—the latter employing an outboard bearing. Compact, for installation in limited space (the basic unit measures 1 x 2½ x 3 ft.), the drive units are provided with drilled and tapped holes to accommodate either hold down or



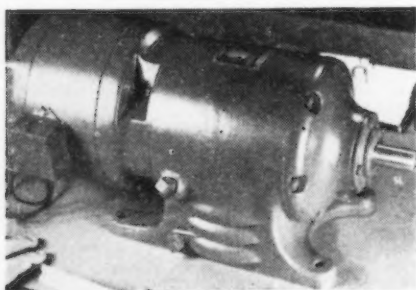
COMPACT basic multi-ratio drive unit (above) now in production at Mechanical Handling Systems, Inc., combines an infinitely variable speed transmission with conventional speed reducer gearing to provide high load capacity with infinitely variable speed control from zero upward. (Below) Vertical output shafts or variations in capacity range to suit different applications are provided through the addition of standard accessory reduction drives.



LEWELLEN variable speed transmission with electrical controls for maintaining uniform tension in winding strip metal. The winding reel starts at its highest speed, and as the strip of material on the spool increases in diameter, the control accurately reduces the speed of the reel to maintain uniform tension. After the reel is filled and is stopped, the control reverses its position to start the cycle over again. This is a product of the Lewellen Mfg. Co., 1040 East 10th Street, Columbus, Ind.



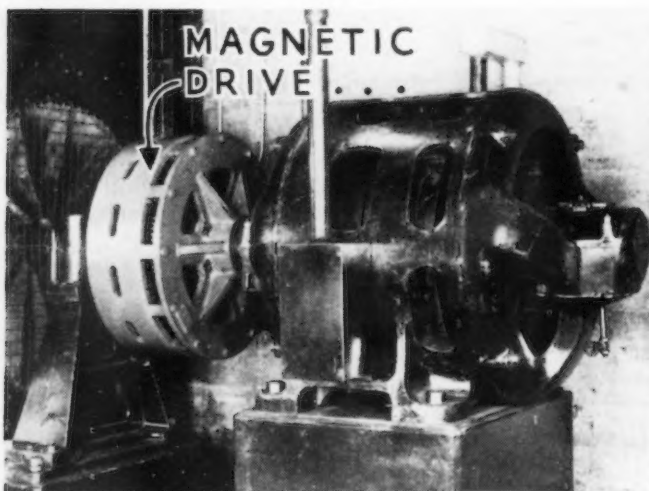
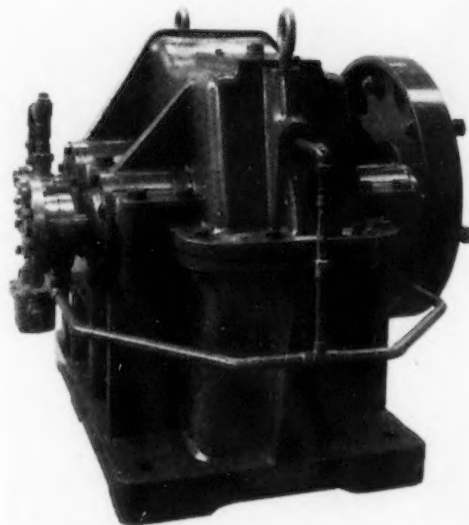
SPEED changes on this multiple belt, variable speed drive motor are effected by turning a handwheel which shifts the motor on the base. Movement of the base is relayed to a yoke which controls the spacing of the V-belt pulley disks. The belt may be tightened or loosened without shifting the entire base by turning an eccentric bushing at the pivot point of the shifting yoke arm, normally fixed in position by a setscrew. A novel lubrication system provides a means of greasing the pulley sliding fits. Motor base ways are accurately machined. This type of motor drive is made by U. S. Electrical Motors, Inc., of Los Angeles, and is sold in the East through a branch factory at 80 34th Street, Brooklyn.



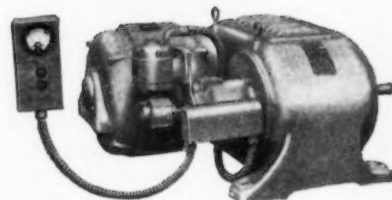
TYPE SME straight-in-line Ratiomotor has been added to the line of motorized speed reducers produced by the Boston Gear Works, Inc., North Quincy, Mass. This self-contained drive is available with either General Electric or Westinghouse motors of 1/2 or 3/4 hp. and in five output speeds of 108, 144, 172, 230 and 276 r.p.m. with full load motor speed of 1725 r.p.m. The first reduction gears in the train are helical, the second straight spur gears, all made of high carbon steel.

AT RIGHT

A NEW line of speed increasers for operating centrifugal pumps, high-speed blowers, and compressors, and for pipe-line service, has been announced by the Westinghouse Electric & Mfg. Co. Standard gear ratios vary from 2 to 1 to 12 to 1, and these new units are available in ratings from 1 hp. per 1000 r.p.m. of the high-speed shaft to more than 1800 hp. per 1000 r.p.m. Speed increasers can be supplied for either right- or left-hand assembly. Sleeve bearings have been designed to provide low unit pressures and permanent alignment. Lubrication is accomplished by a self-contained circulating oil system. Gears are spray-lubricated at the line of contact. Average efficiency of these units is better than 96 per cent.



VARIATIONS in speed with the E-M magnetic drive are obtained by varying the amount of flux passing between a flux linkage ring on the motor shaft and a magnetic flux producer on the driven shaft, giving varying amounts of slip. Made by the Electric Machinery Mfg. Co., Minneapolis.

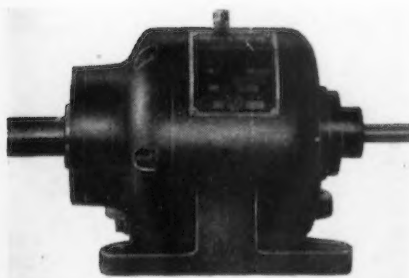
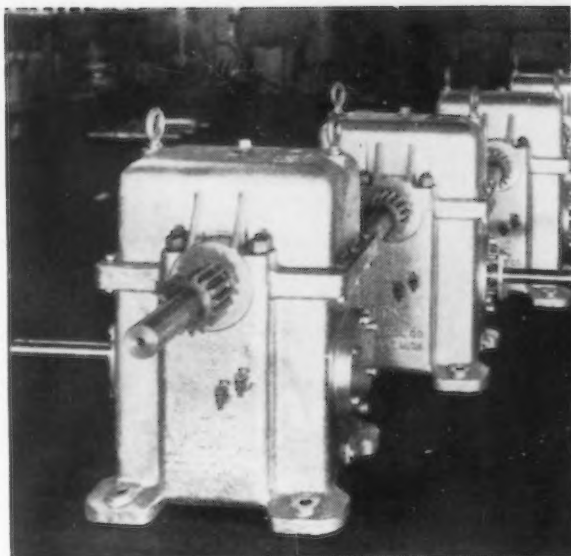


SELECTION of the operating speed from a remote point is provided by a new electric remote speed indicator for the U. S. Varidrive motor, developed by U. S. Electrical Motors, Inc., Los Angeles. The indicator is in the form of a meter calibrated in divisions from 1 to 10, and is mounted in a compact box with the push buttons for controlling the electric pilot motor that changes the speed. The remote indicator station may also be replaced by a single push button station or by automatic control equipment, such as cyclic relays, thermostats, pressure or cam mechanisms.



WHENEVER excessive torque is imposed on the output shaft of the Philadelphia PlaneTorque MotorReduceR, the normally stationary internal gear moves against heavy spring pressure on a lug, tripping a limit switch and stopping the motor.

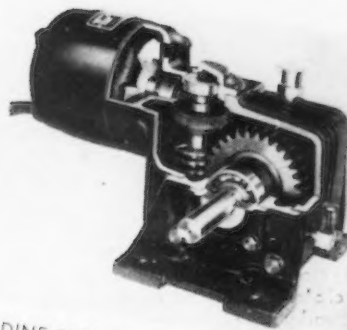
CONE type of worm gearing is now being marketed by the Michigan Tool Co. in a line of standard sizes comprising models ranging from 3 to 15 1/2 in. center distance, with a wide selection of standard ratios for each size.



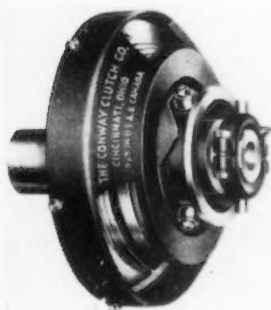
RATIOS of reduction are obtainable up to 20,000 to 1, with torque capacities from 2000 to 5000 in.-lb., in this new No. 7 size differential speed reducer, made by Winfield H. Smith, Inc., Springville, Erie County, N. Y. The unit is modern in design and has anti-friction bearings throughout, including Timken bearings on both high speed and low speed shafts.



DRIVE-ALL motorizing unit with built-in three or four speed transmission for application to machine tools, power presses and other production machinery. With a two-speed motor, six or eight speeds are available. The motor rails are adjustable to accommodate any motor of from 1 to 5 hp. Transmission gears are of ample size and are mounted on ball bearings. The belts may be guarded. These units are made by the Drive-All Mfg. Co., 3406 Connor Avenue, Detroit.

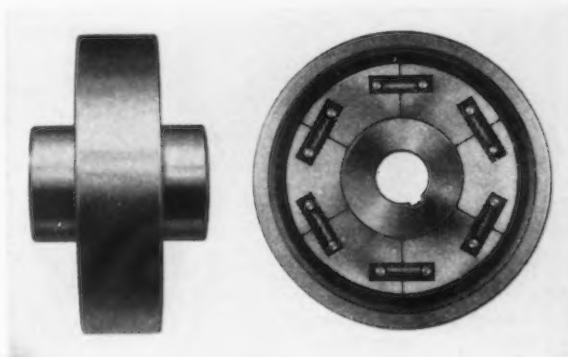


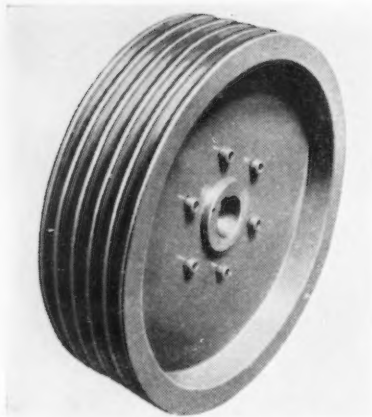
BODINE 30RJ double worm gear speed reducer motor for driving slowly rotating apparatus with high torques from relatively low power motors. The motor itself develops 1/50 to 1/20 hp., depending upon the gear ratio used. The floor mounting is shown. Ceiling, wall and flange mountings are also available from the maker, the Bodine Electric Co., 2264 W. Ohio Street, Chicago. Base to shaft centerline distance is 3 in.



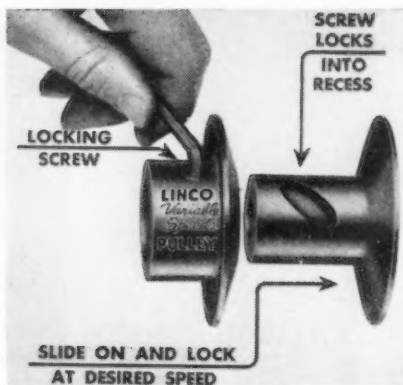
SERIES 650 Conway overload release disk clutch is designed to slip a half turn and then disengage itself automatically once a predetermined torque is exceeded. Series 530 and 550 single and tandem plate clutches are also available that will slip indefinitely, without the disengaging feature. Series 650 and 550 clutches come in capacities of 800 to 6300 in.-lb. torque; series 530, from 400 to 3150 in.-lb. These overload clutches are made by the Conway Clutch Co., 1543 Queen City Avenue, Cincinnati.

D-E automatic centrifugal clutch picks up the load smoothly when the speed of the driver shaft reaches a predetermined amount. The six segmental expansion members, interconnected by tension springs, may be seen at the right. Made by Dawes Equipment, Inc., Detroit.



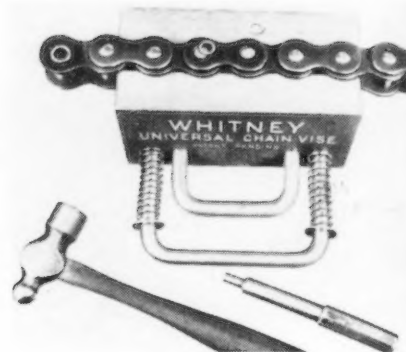


THE range of sizes of Texrope demountable rim type sheaves carried in stock has been extended by Allis-Chalmers Mfg. Co., Milwaukee. These units consist of a substantial bushing on which may be mounted a sheave rim of desired number of grooves and pitch diameter without removing the hub from the shaft. These sheaves can be used to advantage in any application requiring a limited number of fixed steps in speed change. They are available for use with C and D section belts.



THE two separate parts of this adjustable V-belt pulley are sleeve fitting so that they slide together and are held in the desired position by a single Allen set screw. The manufacturer claims that this design allows for a maximum of speed variations and shortens the time usually taken to adjust pulleys from one speed to another. Made by the Linderme Machine & Tool Co., Inc., 12259 Coyle Avenue, Detroit.

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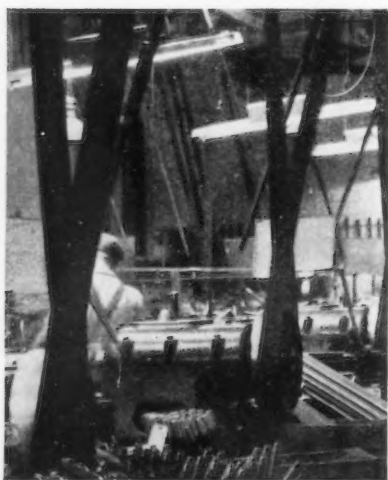
ABOVE

WHITNEY universal chain vise simplifies the repair and installation of cottared or riveted roller chain in pitches from $\frac{5}{8}$ to $2\frac{1}{2}$ in. inclusive. The vise jaw is opened by hand and is tightened by spring pressure. In the example of riveted chain, a few blows of a hammer on the rivet head forces the rivet through the plate, shearing off the head in washer form and eliminating grinding off of rivet heads. With this tool it is also possible to repair a chain without removing it from the sprockets. This self-contained tool is sold by the Whitney Chain & Mfg. Co., Hartford, Conn.

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A NUMBER of improvements have been made in Morse channel lubricated roller chain, made in single, double, triple and quadruple widths, all standard pitches.



DUROIL Hewprene transmission belt, with friction and skim coats made of du Pont's neoprene artificial rubber, is being offered by the Hewitt Rubber Corp. for use in machine shops and similar places where lubricating and cutting oils ordinarily make rubber belts impractical.

drive consists of two simple, compact parts, a flux linkage ring driven by the motor and a magnetic flux producer revolving within the ring and driving the load shaft. Torque is transmitted by electromagnetic forces through an air gap between ring and magnet, and the amount of torque transmitted and hence the speed of the driven shaft is dependent upon the amount of magnetic flux in this air gap. This flux is varied by controlling the amount of current supplied the magnet, by means of a rheostat.

Operation of the magnetic drive is on the slip-loss principle, that is, the power slip loss in the magnetic drive in per cent of motor input is proportional to the difference in speed between ring and magnet. This slip loss is dissipated as heat in the ring member, which is self-cooled. No accessory equipment is required other than a small source of d.c. control current and the rheostat. In the overhung type, the drive requires little more overall length than that of a standard flange coupling. This new drive is particularly suited to boiler draft fans and to centrifugal pumps that require an accurately controllable wide range of variable speed.

Safety Overload Drive

GEARED motor drives made by the Philadelphia Gear Works, Erie Avenue and G Street, Philadelphia, can now be had with a mechanical overload safety device that automatically shuts off the motor when

BELOW

"EASY" chain detacher to facilitate the detaching and assembling of steel Link-Belt. The tool is said to make it easy to bring the chain links into proper position and to have sufficient weight to act as a backing against which to knock the chain apart. With this tool, the links can be brought into position by one hand, while using the hammer with the other. It is designed for all sizes of steel Link-Belt, and is procurable from the Link-Belt Co., Indianapolis.

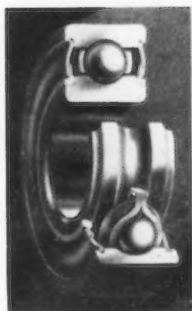


the load on the output shaft exceeds a predetermined value. As soon as the excessive load is removed, the unit is ready to start without resetting. The drive is particularly recommended by the maker for driving conveyors, agitators, mixers and similar types of equipment that might jam or become overloaded. These PlaneTorque Mo-toReduceRs can be supplied for horizontal or vertical drives in all horsepower and ratios for general industrial use.

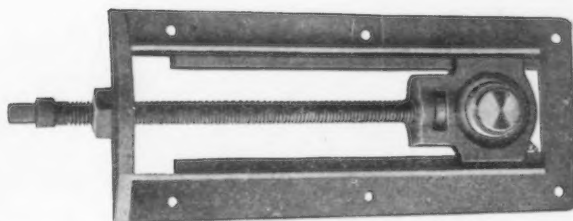
In these drives the gear train is a planetary type, with the output shaft driven by the planetary gear spider.



IDEAL automatic tension motor base maintains correct belt tension through the action of steel springs on the sliding motor base, making the unit especially suited to short center drives. Same base may be used horizontally, vertically or overhead. Spring tension holds the motor, takes up slack and cushions load shock. Adjusting screws are provided to take up normal stretch in the belts. The motor is mounted directly on the sliding plate, making installation easy. Belt changing is effected by simply releasing the spring tension. This motor base is being marketed by the Ideal Commutator Dresser Co., 1925 Park Avenue, Sycamore, Ill.



IN the new SKF Red Seal ball bearing, the seal used is one that can be applied to bearings having a standard single row SAE dimension of bore, inner and outer race width, using full size balls. Sealing against dirt is by the felt fiber contact on the polished surfaces of the inner race and by the utilization of the tendency of the deflected felt to resume its original flat shape. Sealing action is so light, however, that friction drag is minimized, and the bearing is suitable over a great range of speed. Ample lubricant space is provided. This bearing is designated by SKF Industries, Inc., of Philadelphia, as the 6200 RS series and is available for shafts up to approximately 1 in. in diameter.

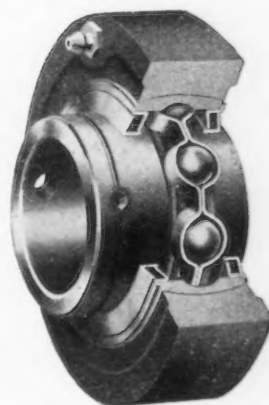


SEALMASTER style H steel frame take-up unit, supplied by Stephens-Adamson Mfg. Co., includes a Sealmaster standard duty cartridge type ball bearing in the take-up housings. A style G is also made with single angle iron frame, protected screw and malleable iron ends. These units are suitable for use in adjusting shafts and tightening belt bearings. They are supplied for shaft diameters from $\frac{7}{8}$ to 2 $\frac{7}{16}$ in.

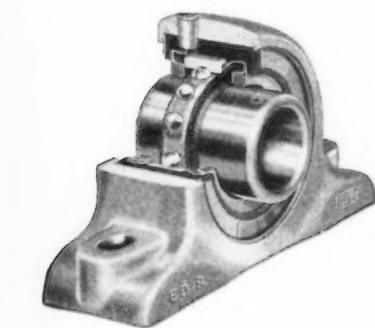
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MISALIGNMENT up to 4 deg. in any direction is permitted in the new self-aligning Sealmaster ball bearing cartridge units, recently added to the line of the Stephens-Adamson Mfg. Co., Aurora, Ill. The bearing's outer race is ground as a section of a sphere and is locked in a ground housing socket with a locking nipple which limits the misalignment. A combination felt and centrifugal labyrinth seal is employed, assembled without pressure on the inner race. These bearings are made for shaft sizes from $\frac{7}{8}$ to 2 $\frac{15}{16}$ in.



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LOW cost, sound insulated, ball bearing pillow block announced by the Ahlberg Bearing Co., 3025 West 47th Street, Chicago. The precision CJB ball bearing is insulated from the die cast housing by a molded cushion of neoprene, a synthetic rubber impervious to oil and grease. The seals, also of neoprene, are of a floating construction to give long seal life. Ample provision is made for normal misalignment. The bearing is electrically grounded. Shaft sizes are $\frac{1}{2}$, $\frac{3}{8}$, $\frac{3}{4}$, 1 $\frac{5}{16}$ and 1 in. These units are designed for light duty, such as on domestic air conditioning units, where quiet operation is desirable.

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The internal gear, normally fixed in position, in this design is free to move a small amount, being restrained in normal position by heavy spring pressure acting against a lug. When the torque on the internal gear exceeds a predetermined amount, the torque spring's pressure is overcome and the lug advances, tripping a limit switch and stopping the motor. These units are furnished for clockwise or counterclockwise rotation, or for both if reversing service is required.

Cone Worm Gear Drives

ASTANDARD line of heavy duty speed reducers incorporating the Cone type of worm gearing has been

announced by Michigan Tool Co., 7171 E. McNichols Road, Detroit. Covering center distance ranges from 3 to 15 $\frac{1}{2}$ in., the new speed reducers are priced competitively with conventional worm gear reducers of equal capacity, while representing substantial savings in size and weight due to the use of the Cone worm gearing type of drive. Capacity for capacity, the new units are roughly two-thirds the size of standard worm gear reducers, with a proportionate saving in weight. The reduction in size is due to the fact that the larger area per tooth and greater number of teeth in contact with Cone worm gearing permits a material reduction in center distances for the same load capacity.

Unusually high efficiencies and long life are claimed for the units. The latter is attributed to the fact that in Cone worm gearing, both worm and wheel tend to regenerate their true

form in service. Part of the high efficiency is said to be attributable to the lubrication characteristics of the gearing, the entering worm spreading oil on the contact surfaces instead of the oil being squeezed out. Also contributing is the elimination of the necessity for heat treatment after finish machining, thus avoiding heat treating errors.

The new standard line of Cone-drive speed reducers are all of the vertical worm-on-bottom type. They are designed for heavy duty service throughout, with rugged cast housings of high tensile nickel iron.

The Cone worms are of chrome-molybdenum-nickel steel. Nickel bronze is used for the worm wheels. Anti-friction bearings are used throughout except for the sleeve bearings on the gear shaft in the largest units. Roller bearings are used in the gear shafts in the smaller and intermediate sizes.

(CONTINUED ON PAGE 60)

THIS WEEK ON THE

ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

... GM to celebrate building of 25,000,000th car ... January output to be high for replenishment of dealers' inventories ... New surface finish analyzer combines elements from cardiograph and phonograph pickup ... "Invisible light" for war-time blackouts is reported through Graham ... Long-life battery oxide is introduced.

DETROIT—Completing its 25,000,000th automobile since 1908, General Motors Corp. celebrates today (Jan. 11) the passing of another important milestone in the history of the automobile industry. The 25,000,000th car, a Chevrolet, was scheduled to leave the assembly line of the Chevrolet plant in Flint about 11 a. m., according to W. S. Knudsen, GM president.

Ceremonies appropriate to the occasion will be staged at the Chevrolet plant, with Mr. Knudsen and Alfred P. Sloan, Jr., chairman of the board, present. Mr. Knudsen has also invited approximately 5000 persons to Masonic Temple in Detroit for an evening program which will honor veteran employees of the corporation, many of whom helped to build the first General Motors cars.

Production of automobiles during

the first week of 1940 was approximately the same as it was between Christmas and New Year's Day. Four-day working schedules held assemblies to a total of only 87,510, compared with 89,365 in the previous week and 76,685 in the corresponding week of a year ago, according to Ward's Automotive Reports. No significant change occurred during the week except a routine shutdown at Studebaker and Federal Truck for inventory, and the reopening of Packard after a week's closing for inventory. Ford maintained the output of Fords and Mercurys at 20,000; Lincoln-Zephyr output was 640 compared with 660 in the previous week. Chevrolet was steady at 23,000. Plymouth gained from 10,350 to 10,480.

Production Outlook Good

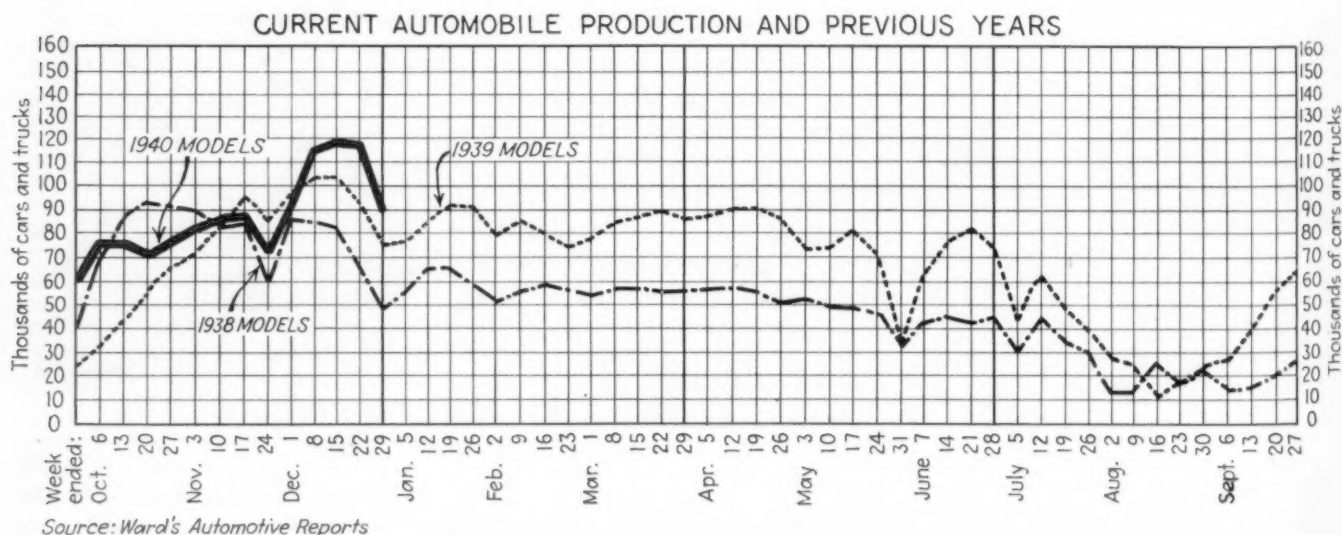
The production outlook for January is very good, with all major producers

expected to continue at a high rate in an attempt to build up dealers' stocks, which are still below normal. A rebound to 100,000 units a week is expected for the current week.

Ford reveals that, with the general automotive index at record levels, production for the last quarter of 1939 in Ford plants was almost double that of the same period in 1938. Ford employment throughout the country is at the highest level in several years, standing at 120,000. A large increase in employment was made during the last year at the Rouge plant, partly due to the fact that approximately 10,000 tractors were produced during the last half of the year.

A New Surface Analyzer

The cardiograph, commonly seen only in a physician's office or hospital, furnishes the basis for a new instrument which was demonstrated privately a short time ago in the Superfinish laboratory at the Chrysler Jefferson Avenue plant. The new instrument consists of the recorder, as used with the cardiograph, plus the stylus used with the radio broadcasting phonograph pickup, plus the crystal and amplifier which are used commercially in both the phonograph pickup and the cardiograph—and in addition, a gear



ACCURACY...

makes the difference



PLAYTHINGS of the rich rapidly become available to all. Accuracy makes the difference. Accuracy—the kind that means machine tool precision to ten-thousandths—is a boon to mankind. It has multiplied leisure in the wake of increased production and lowered costs. It has given our generation the magic of low cost transportation, the radio and countless other products that eliminate drudgery and add to the joy of living.

Accuracy has been a tradition at Pratt & Whitney since 1860. Today over 2000 skilled Pratt & Whitney craftsmen carry on that tradition. Every machine tool, every cutting tool, every precision gage built by these men transmits Pratt & Whitney accuracy to the products it makes. When you buy new equipment be sure to investigate Pratt & Whitney precision machine tools, small tools and gages. They pay dividends.

PRATT & WHITNEY

Division Niles-Bement-Pond Company • Hartford, Connecticut, U. S. A.



W S. KNUDSEN, president of General Motors Corp., C. L. McCUEN, general manager of Oldsmobile, GOV. LUREN D. DICKINSON of Michigan, R. E. OLDS, founder of Oldsmobile and 300 veteran Oldsmobile employees honored CHARLIE BLADES, right above, in Lansing, Mich., on Dec. 29. Blades is Oldsmobile's oldest employee, is also the oldest employee in years of service in the entire automobile industry, and his company is the oldest manufacturer in the motor car field. It was Blades' 80th birthday. As a blacksmith, he hammered out the front axle for the first commercially successful automobile produced in America, the 1897 Oldsmobile. Today he is employed as an information clerk in the tool division at Olds.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



drive mechanism with flexible shaft connections.

The result is a surface analyzer which charts the amplitude and direction of irregularities on the surface of any material, giving actual readings in millionths of an inch. Because the new instrument gives *absolute* micro-inch readings instead of root mean square (or average) micro-inches, it upsets a lot of previous data on the subject of surface smoothness. The absolute readings are approximately one-third the values which have been generally quoted in discussions of surface finish in the last several years.

The instrument, product of the Brush Development Co. of Cleveland, not only provides a measure of the roughness or smoothness of a surface, but accurately plots the topography of the surface.

The new method of measuring and plotting the surface characteristics satisfies a long-felt need, according to D. A. Wallace, Chrysler Superfinish developer, because it not only measures surface defects, but also shows clearly the desirable surface qualities of various kinds of surface finishes. While the instrument, as the name implies, gives a detailed analysis of specimen surfaces, it is rapid enough in operation to be used for production checking of parts if desired.

"Invisible Light" Used in Europe

For more than a year factory officials at Graham have had information on a development called "invisible light" which is being used to keep automobile traffic moving during European blackouts.

Through a devious route from Holland, Graham officials learned of the invention of a Dutch army officer which is half military, half automotive in nature. According to the information available, the invention consists of a lamp which projects its beam forward over a small area so the beam cannot be seen from above at a height greater than 80 yards. Even raiding airplanes cannot fly this low safely. The lights are said to be sufficiently strong to permit a 40-mile-an-hour speed over known roads. It has been found very useful when air raid threats, real or simulated, cause all lights to be extinguished. Without it, traffic becomes snarled, hindering the work of motorized defense and ambulances as well as commercial traffic.

Several variations of the lamp are said to have been developed in the last year. One of these is a tail lamp for motor caravans. All following cars can switch off their headlamps and

follow the car ahead whose "invisible" tail lamp can be seen only by the driver directly in line with the beam.

Another development is a light for road orientation. For this purpose, lamps have been constructed which are placed every 300 yards along the right hand side of the road. As long as the driver sees the light, and can never see more than one at a time, he can be sure that he is on the correct side of the highway. At corners, pavement lamps warn of turns. Lamps of this type have also been developed for use in writing and reading, according to the information which Graham has obtained.

Transcribing Method for Drawings

Last year's automotive die program saw the successful use of a new method of transcribing contours from wood and plaster models. It has been the practice in automobile and sheet metal work to start out with the art department drawings suggesting a new model and work from these small-scale picture drawings to a full-scale chalk board illustration. Then, when the design has finally taken form, it is usually the practice to make preliminary engineering layouts and, from all of this preliminary work, construct a full-scale wooden model. After approval comes the difficult period of preparing accurate working drawings, with every contour and with all variations of shape shown clearly and properly dimensioned.

At this stage of the engineering work it has been common practice to work from templates, by scaling off the model and other ingenious tricks of the draftsmen—all of them, however, requiring a great deal of painstaking work and constant double-checking to avoid inaccuracies.

One die designing organization in the last year made use of a jig for supporting full-scale models of fenders and other important parts above the drafting board, so that, by using a height gage between the paper surface and the model, dimensions could be read accurately and lines transferred to the paper very quickly.

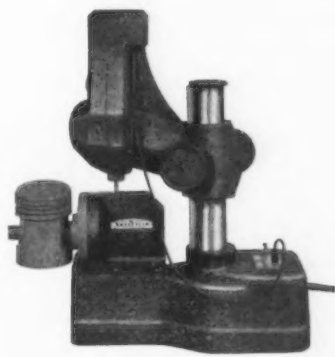
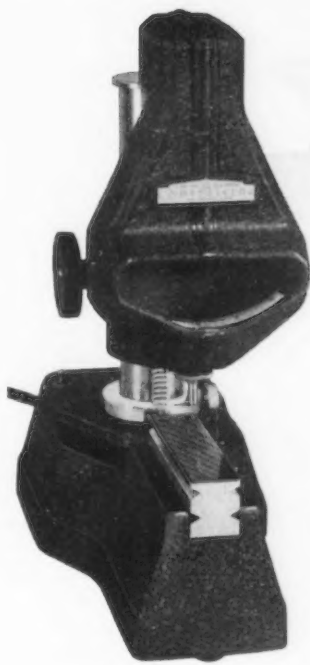
The jig is simple, consisting of four round steel uprights, each threaded, and one mounted at each corner of the flat drawing table. The model is suspended from these four uprights, generally inverted. It is possible to adjust the supporting cradle to put the model at any angle so it is in proper position with respect to center lines being used for the drawing. Patent is pending on the device.

New Type of Battery Oxide

Announcement of an automobile battery that grows stronger with use by

(CONTINUED ON PAGE 61)

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THIS WEEK IN WASHINGTON

... Supreme Court decisions upholding NLRB spur demand for Wagner Act revision ... Recall of Edison's more-power-for-F.D.R. letter hinted ... President's 7th "deficit message" starts disputes ... Moral embargoes help neutrality laws in limiting U. S. exports.

By L. W. MOFFETT

The Iron Age

WASHINGTON—Three unanimous Supreme Court decisions upholding far-reaching powers of the National Labor Relations Act to determine collective bargaining units have stimulated demand in Congress for revision of the Wagner Act. While there was no lessening of criticism of administration of the law by the present board, it was conceded that the court decisions made it clear that the remedy for complaints against the situation lies with Congress. The board has power over the very existence of a labor union within the terms of the law itself, as shown by the court decisions, and as has been widely contended by industry, which is critical of both the act and its administration by the board. They long have maintained that provisions of the act place broad discretionary power in the board and that though the power has been greatly abused the only remedy for curbing its authority is through amending the act.

No Appeal Until Final Order

An outstanding point made by the Supreme Court which gave emphasis to demand for modification of the law was that there is no appeal from any board action until after an election has been held and a final order entered. Review of certifications at the hands of the court cannot be obtained. Regardless of the costs to an industry or loss of wages to employees, the board may delay at its will an election and be immune from court attack. In its decisions the court held that:

Federal Court of Appeals is without jurisdiction to pass upon board's certification of a CIO union as collective bargaining agency for all Pacific Coast longshoremen. (AFL had asked that certification be set aside.)

Federal Circuit Court erred in ruling an AFL affiliate should be on ballot, on which board named only a CIO union, to determine employee representation of Consumers' Power Co., Jackson, Mich. (Companion case to Longshoremen decision.)

Federal Circuit Court was without authority to amend board order naming only the Amalgamated Association of Iron, Steel and Tin Workers, CIO affiliate, and the Operating Engineers, AFL affiliate, on ballot for collective bargaining representation at plant of Falk Corp., Milwaukee. United Circuit Court of Appeals of Seventh District, had ordered name of the Independent Union on the ballot. Board has held and was sustained by Supreme Court, that the Independent was company dominated and should be disestablished. Justice McReynolds took no part in this case.

Black Delivers Falk Decision

Opinions in the first and second cases were delivered by Justice Stone. The opinion in the Falk case was delivered by Justice Black.

Comment in Congress on the decisions plainly showed that a strong effort will be made to have the act amended at the present session. It is believed that support for this move may be expected not only from the special House Committee which is investigating operations of the act and its administration by the board but that the AFL, defeated petitioner in two decisions, will intensify its drive to have the act revised to meet its demand, particularly as to compelling wider board recognition of the craft union. The board has, however, repeatedly pointed that the AFL itself has increasingly requested some form of industrial unit for collective bar-

gaining and that it has been fair in granting craft unit recognition. In its annual report for the fiscal year 1938-1939, announced last Saturday, the board said that during the year the AFL requested the industrial unit in approximately 113 cases and a craft form in 68 cases. In 54 of these 68 cases, the board granted the AFL requests in full, either by setting up the craft employees directly as a separate unit by permitting the craft employees to make their own choice. In only 15 instances, the report said, did the board reject a claim for craft units.

Change in Law Needed

The decision in the longshoremen's case, said Representative Ramspeck, Democrat of Georgia, a member of the House Labor Committee, "makes necessary an amendment to the act limiting the unit of bargaining to one employer." He declared that such an amendment should prohibit interpretation of "employer" to include an association of employers. Representative Routzohn, Republican of Ohio, a member of the special House Investigating Committee, said the three decisions, handed down on Jan. 2, "helped clarify the situation and made it obvious that if any remedy is needed, that remedy must come through a change in law."

In the longshoremen's case, reflecting a split between the AFL and the CIO, the latter successfully challenged the International Longshoremen's Association, which for many years represented the Pacific Coast dock workers. The board, responding to a CIO request, held a hearing and certified the International Longshoremen's and Warehousemen's Union.

In asking that the certification be set aside, the AFL told the Circuit Court of Appeals for the District of Columbia that the Wagner Act does not contemplate or authorize "the designation by the board of an employee unit constituting all the employees of different employers in different and distant geographical districts of the United States."

Address Arguments to Congress

Request was made that certification be set aside in so far as it attempted to designate a single exclusive bargaining representative for longshore employees of many employers on the Pacific Coast and denied to a majority of the longshore employees of a single

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employer the right to select one of the AFL units as their exclusive bargaining representative. The Court of Appeals, upholding the board's contention, said it lacked jurisdiction and the Supreme Court said that "the conclusion is unavoidable that the Congress * * * has excluded representation certifications of the board from review" by the appellate courts under such conditions. The act, the Supreme Court said, gives a right of review to "any person aggrieved by a final order of the board" and determines the na-

ture and scope of the review by the Court of Appeals.

"It seems to be thought," said the decision, "that this failure to provide for a correct review is productive of peculiar hardships, which are perhaps not foreseen in cases where the interests of rival unions are affected. But these are arguments to be addressed to Congress and not to the courts."

In the Consumers' Power Co. case the Supreme Court reversed the Sixth Circuit Court of Appeals, which, upon

petition of the AFL set aside a board order for a run off election to determine whether employees wanted to be represented by a CIO union. The AFL protested that its exclusion from the ballot infringed on the right of the employees to a free choice of their bargaining unit.

Opinion in Falk Reverses

In reversing the Seventh Circuit Court of Appeals in the Falk case, the Supreme Court, speaking through Justice Black, said that "the board justifiably drew the inference that this (Independent) company-created union could not emancipate itself from habitual subservience to its creator, and that in order to insure employees that complete freedom of choice * * * Independent must be completely disestablished and kept off the ballot." The lower court held by a 2 to 1 decision that the Independent had a right to be considered for purposes of collective bargaining, so long as the employer did not attempt to dominate the election. It therefore ordered that the Independent be placed on the ballot along with the Amalgamated and the Operating Engineers. The board's order for an election as between the CIO and AFL unions came before the lower court together with charges of unfair labor practices and the two subjects were consolidated for review. The charges were upheld but the right of the court to add the Independent to the ballot was challenged by the board.

Court Lacks Jurisdiction

The Supreme Court said Congress had given the board the power to draw the inference it made respecting an allegedly company-dominated union. As Justice Stone had done, Justice Black held that the court had no jurisdiction to pass on a proposed election and in effect supervise the manner in which it should be conducted.

Meanwhile the AFL, proceeding under the court's "general jurisdiction," is proceeding with another action in the District Court in the District of Columbia to test the validity of the board order in the longshoremen's case. Declaring it is destructive of the AFL's dock workers union on the Pacific Coast, the lower court was asked to set aside the order.

President Green of the AFL also made an appeal to Congress last Thursday for support of the federation in its contest with the CIO. Together with a letter to each member of Congress he sent a voluminous document giving the federation's views over the split with the CIO, asked (CONTINUED ON PAGE 61)



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Identical Bids Reported On 10.15% of Government Orders

WASHINGTON—The Government chant against identical bidding, the prelude to which was launched several years ago by Interior Secretary Ickes and the Federal Trade Commission and which reached its crescendo when President Roosevelt in May, 1938, criticized the practice as possibly "unlawful" on its face, was taken up anew last week when the Treasury Department's procurement Division reported to the Temporary National Economic (anti-monopoly) Committee that out of \$860,044,970 expended by the Government during the 12-month period ended November, 1938, \$87,326,426 worth of supplies, or 10.15 per cent, represented purchases on which identical bids had been received.

Out of 25,610 identical bids examined and divided into 17 industrial groupings, 6693 bids or 26.1 per cent covered purchases of iron and steel and their products, 2988 bids or 11.7 per cent for machinery, and 641 bids, or 2.5 per cent for non-ferrous metals. No breakdown was reported for the proportion of identical bids received in the individual industrial groups but the report said that for all 17 industrial classifications there were 331,851 bid openings, of which 76,705 or 24.1 per cent covered instances where identical bids were received.

Breakdown of Steel Bids

Out of the 6693 bids classified as "iron and steel and their products," 1169 were for wirework; 1014 for plumbing supplies; 766 for steel works and rolling mill products; 554 for structural steel; and 548 for wrought, welded and heavy riveted pipe. Under the machinery classification, machine tool accessories and machine precision tools showed the greatest prevalence of identical bids with a total of 457 instances. The industry classification for the 1937 census of manufactures was followed in sorting and analyzing the identical bids sampled.

The 113-page report, based on a study requested by the TNEC in September, 1938, covered material supplied by 45 Federal agencies, although information had been solicited from 60 agencies. Only 37 submitted "comprehensive reports" and of this number only six offered suggestions. Three reported they had no information available, eight specifically said they had no suggestions to make and 18 replied "no comment." One agency

advised the Procurement Division that identical bids had been found advantageous in the purchase of machinery.

Asked to comment on any influence which they believed arose from control of sources of supply, 21 agencies said they had no information on the subject, six replied "no comment,"

three called it "a noticeable factor," two reported "little or no influence" and one agency said it was "a noticeable factor in steel."

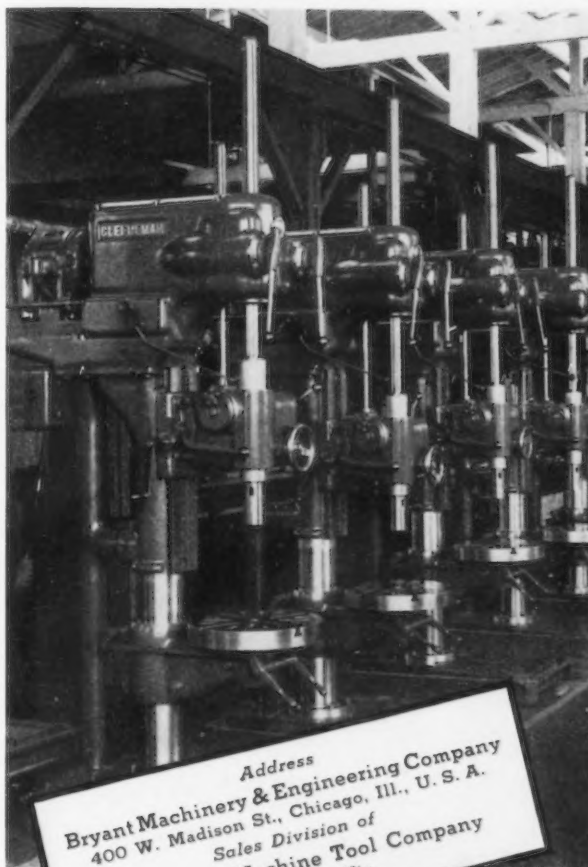
Controlling Factors

Reflecting the results of the inter-departmental poll, the report listed these factors, some of which have been encouraged from time to time by the Government itself, as being conducive to the practice of submitting identical bids:

1. The adoption of industrial stand-

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ards relating chiefly to quality, size, finish and performance, and the utilization of standardized manufactured machinery and materials, have the effect of reducing variations in production costs.

2. Legislation of whatever sort, which provides for market agreements or for minimum resale prices, tends to result in identical prices.

3. Fair practice agreements in industries tend to produce identical prices.

4. Price control or leadership by a

single or by a few leading manufacturers in any given industry tend to cause identical prices. If in existence, outright price agreements between producers would produce the same result.

5. Trade associations are believed to have a tendency to foster practices which bring about identical prices. Among such practices may be mentioned: (1) the adoption of price schedules; (2) the allotment of sales territory among the members of the association based on production facil-

ities, geographical restrictions, transportation limitations, or other basis.

Suggested Solutions

Identities of the six agencies offering suggestions were not disclosed but they advanced these possibilities for handling the problem:

Agency A—Report cases of identical bids or any suspicions of collusion to a designated authority empowered to exercise discretion as to necessity for further investigation. Require bidders to certify that prices bid are not the result of any agreement nor have been disclosed to any other bidder prior to bid opening. Where possible request bids f.o.b. point of shipment without disclosing the point of delivery.

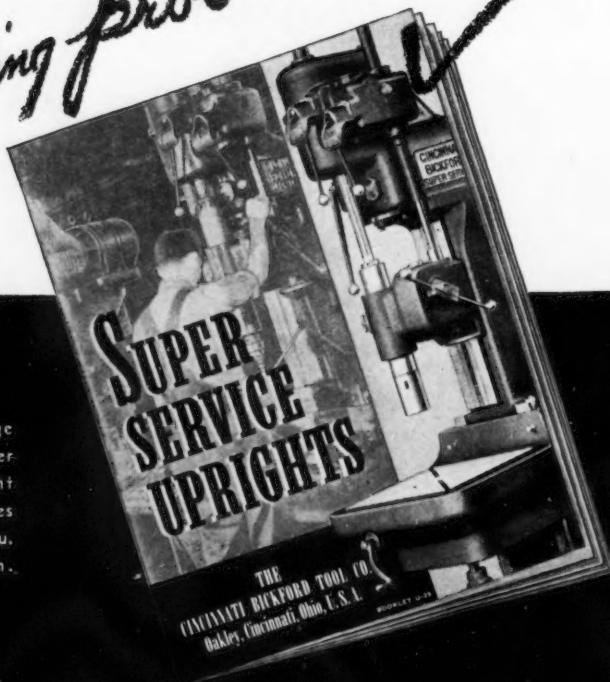
Agency B—Where there is evidence of collusive bidding and tie bids are relatively lower than untied bids, reject all bids and place a mandatory order with one of the tie bidders selected by lot, with the provision for the payment of 75 per cent (or other fixed percentage) of the tie bid price, the final payment price to be the fair price for the material determined by a cost investigation. Legislation would be required to make effective such a system. Investigate the cost of production throughout an industry, surrounding which there was found to be evidence of collusive bidding, and by public declaration establish a "fair price" for the product, thereby publicizing any evidence of excessive profits.

Agency C—Enact special legislation to discourage and eliminate the practice of identical bidding and require Government purchasing agencies to submit pertinent information to another governmental division whose job would be to conduct investigations and determine causes of collusive bidding.

Agency D—Find substitute commodities on which competitive prices can be obtained and attempt to develop new sources of supply within certain commodity fields both as to manufacture and distribution. Enact legislation designed to encourage bidders to bid lower prices by making all awards to one bidder by drawing lots where identical bids are encountered in repeated purchases of a particular commodity. Place maximum limitations on Government purchase prices for certain commodities at figures known to be reasonable.

Agency E—Enforce present anti-monopoly laws to curb the activities of "powerful, unscrupulous groups." Limit the powers of purchasing agencies to reporting certain practices to

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the proper authorities, without interfering with the regular purchasing operations.

Agency F—Broaden the range of bid solicitation in the hope that there will always be some suppliers anxious to lower their prices in order to stay in business. Conduct preliminary drawing between companies offering the same product so that large number of bids sometimes submitted by the same manufacturer would be reduced. It was contended that such a procedure would encourage additional manufacturers to submit bids on the theory that the chances for obtaining the business had improved.

In treating the subject of identical bids, the Procurement Division divided the various bids into three classifications identified as Class 1—all bids identical in all respects; Class 2—of all bids received, two or more which are the lowest are identical in all respects; and Class 3—of all bids received, two or more which are identical in all respects are higher than one or more of the other bids received.

Referring to these three classifications, Agency F reported:

"Type 3 openings are not bothersome and it is the opinion of this office that there is no disadvantage to the Government in receipt of such bids. The only loser under such openings are those who prefer to follow an adopted price rather than compete with a firm which prefers to operate on a cost plus basis."

Out of the 6693 cases of identical bids reportedly received on iron and steel and their products, 1354 were listed under Class 1, 1805 under Class 2, and 3534 under Class 3.

The report did not attempt to single out any one industry for scrutiny but merely reported that the objective of the survey is the determination and development of factual information "to facilitate the appraisal of the practice" and to "serve as authentic foundation data upon which more advanced studies may be predicated."

It noted that the quoting or bidding of prices which are in all respects equal is "a commercial and industrial practice closely associated in the minds of a very considerable group of people including persons both in public and in private life, with illegal restraint of trade and with monopolistic control of markets."

Some observers forecast that as a result of the survey the TNEC will make definite recommendations to Congress but there were expressions of doubt that Congress would follow

through with any action. Identical bids have been the subject of attacks by the Federal Trade Commission, the Interior Department and on one occasion the Procurement Division sought to purchase cement on an f.o.b. mill basis but later abandoned the plan. The one sour note to the Government's cause came when former Attorney General Homer S. Cummings reported that identical bids did not constitute evidence of collusion and that the practice did not come within the scope of existing general legislation.

Two Navy Department Awards Total \$94,835

WASHINGTON—The Bureau of Yards and Docks, Navy Department, has awarded a \$68,810 contract to the Harnischfeger Corp., Milwaukee, for bridge cranes for the Norfolk, Va., and Boston yards, and a \$26,025 contract to the Orton Crane & Shovel Co., Chicago, for a locomotive crane for the Boston yard.



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Sharp Disputes Likely Over President's Budget Message

WASHINGTON — With an "election year complex" standing out like a rash, the second session of the 76th Congress appeared this week to face a turbulent season ahead with the possibility of sharp disputes breaking out over President Roosevelt's recommendations for special defense taxes and for continuation of the Administration's reciprocal trade agreement program. There were indications of grumblings over Mr. Roosevelt's proposed \$1,800,000,000 for national defense expenditures, although it was freely admitted that opposition to this item in the face of world conditions might prove to be unpopular with constituents back home.

Party lines appeared to be split over the reciprocal trade program and over the proposal for special defense taxes and it was openly conceded by some members that new taxes—whether for defense purposes or otherwise—were extremely unlikely in an election year.

Defense Gets Attention

In Mr. Roosevelt's message to Congress on the budget, his proposed expenditure of \$1,800,000,000 for national defense purposes overshadowed all others. His thumbnail picture of the budget, prepared, he said, in a simple form which any layman can understand, looked like this:

Expenditures for national defense	\$1,800,000,000
For work relief programs	1,300,000,000
For agricultural programs	900,000,000
For public works and investments	1,100,000,000
Pensions, retirements and assistance	1,200,000,000
Interest on the public debt	1,100,000,000
Regular operating expenses	1,000,000,000
Total	\$8,400,000,000

Briefly, this proposed budget means more money for the Army, Navy, Coast Guard, Federal Bureau of Investigation, social security and interest on the public debt, and less money for relief, public works, farm benefits, Government relief jobs, CCC camps and for the National Youth Administration program. Mr. Roosevelt noted in his message, however, that "if con-

ditions fail to meet our hopes, additional funds may be necessary" for work relief and for agricultural parity payments in 1941.

No Defense Cost Breakdown

The President did not provide a breakdown for the \$1,800,000,000 item for national defense except to divide it into classifications—one for normal defense requirements; the other for emergency preparations. The expenditure in the emergency brackets for the fiscal year 1941 was listed as \$300,000,000 and for the current fiscal year, \$160,000,000 although more than that amount is being obligated for future outlay. The special tax recommendation for \$460,000,000 would cover only the estimated emergency expenditures of \$300,000,000 next year and the \$160,000,000 this year.

With reference to the category of public works and investments, in which were grouped useful public works, commercial ship construction and loans for agricultural aid, the President renewed a previous recommendation that Congress authorize Government capitalization of projects which have proved themselves to be self-liquidating. Significance was attached to this suggestion in some quarters because it was suggestive that the Administration may revive its self-liquidating public works proposal on which Congress turned thumbs down last session.

In any event the budget figures submitted to Congress by Mr. Roosevelt mean that expenditures this fiscal year ending June 30 will be \$9,099,253,641; next year, \$8,424,191,570. Revenue this year, excluding social security taxes, will be \$5,166,440,000; next year, \$5,547,960,000. As compared to this year's deficit of \$3,932,813,641, next year's deficit will be \$1,716,231,000 provided Congress levies the \$460,000,000 in proposed new taxes—a possibility which is not at all certain.

The 1941 deficit will be the seventh consecutive one under the present Administration, and the eleventh consecutive one under both Roosevelt and Hoover administrations. The gross public debt on June 30, 1940, will be \$43,222,346,052 and on June 30, 1941, it will be \$44,938,577,622, or within \$61,422,378 of the national debt limit of \$45,000,000,000 fixed by Congress.

Moral Embargo Aids Neutrality Laws in Limiting U.S. Exports

WASHINGTON—Two months of experience under the revised neutrality act, under which the arms embargo provisions of the old neutrality law were repealed, indicates that two forms of restrictions which in effect amount to embargoes on United States exports have grown up.

One exists by virtue of the new neutrality law, which restricts American ships from entering well-defined combatant areas surrounding Europe, and amounts to an embargo only in instances where certain foreign nations are unable to carry American products away in their own bottoms. The other restriction, generally referred to as the "moral embargo," has so far been limited to exports of aircraft, engines, parts and high quality aviation fuel and so-called strategic and critical war materials of which this country is building up stock piles to insure an adequate domestic supply. Conceivably, it could be broadened to include a wide range of manufactured commodities.

No Enforcement Teeth

As the designation implies, the "moral embargo" does not have the full force and effect of law and therefore lacks legal enforcement teeth. It is merely imposed by requesting prospective exporters to refrain from shipping certain products to certain foreign countries; and to the extent that recalcitrant companies will bear the stigma of performing what could reasonably be construed as an unpatriotic act enforcement of the "moral embargo" is expected to be completely effective.

Moreover, some of the commodities on which a "moral embargo" has been imposed are classified under the neutrality law as arms, ammunition and implements of war, and exports of these products must be registered and licensed with the State Department's Munitions Control Board. Hence while that board actually has no authority to limit exports, except in the case of tin plate scrap, the registration requirement does give the Government a complete export record on those commodities.

The moral embargo on exports of aircraft and equipment, molybdenum, aluminum and high quality aviation gasoline, was aimed particularly at Russia, although the nomenclature

employed in letters going to manufacturers made the request also applicable to Japan or any other country guilty of bombing and machine-gunning of civilian populations from the air. The move has been described as the Administration's latest retaliatory step short of war which this country can

take against aggressor nations — a subject to which President Roosevelt has referred on several occasions.

High Test Gasoline Included

Apparently the moral embargo could be made to apply to a wide range of commodities if the Administration so decreed. By including high quality aviation gasoline—a product on which registration and licensing is not required—the State Department has indicated that the Administration does

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Rods, of course, are not the only use for Monel. It is equally practical for pickling crates, racks, chains and hooks. Fabricate it to any shape you need. Monel welds readily and the welds stand up.



Cross-sectional view of three tie-rods after a 12-month test in well-known steel sheet mill. Monel (left) is uniform through its whole diameter. The other two rods, while still unchanged in diameter, are weakened by a change in their metal structure brought about by corrosion.

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not necessarily intend to confine the moral embargo to products classified as arms, munitions and implements of war.

In advising manufacturers of aircraft, engines and parts on the "moral embargo," the State Department merely expressed the "hope" that it would not receive any application for a license to export these products and President Roosevelt reiterated the phrase on Dec. 2. He said:

"The American Government and the American people have for some time pursued a policy of wholeheartedly condemning the unprovoked bombing and machine gunning of civilian populations from the air.

"This Government hopes, to the end that such unprovoked bombing shall not be given material encouragement in the light of recent recurrence of such acts, that American manufacturers and exporters of airplanes, aeronautical equipment and materials essential to airplane manufacture, will bear this fact in mind before negotiating contracts for the exportation of these articles to nations obviously guilty of such unprovoked bombing."

This statement was followed by State Department announcements specifically extending the "moral embargo" to molybdenum and aluminum on Dec. 15, and to high quality aviation gasoline, gasoline manufacturing plans, and similar technical information on Dec. 20.

Critical Materials Curb

Although the term "moral embargo" was not attached to it at that time, the Administration launched the movement late in September when Mr. Roosevelt suggested at a press conference that exports of strategic and critical war materials be curbed in the interest of national defense. Receiving his cue from the War and Navy Departments, the President mentioned in particular manganese, chrome ore and tungsten on which bids had been invited at that time under the strategic and critical material purchasing law.

The War and Navy Departments followed through in October with a warning against exporting materials "essential to the industrial economy," listing antimony, chromium, manganese ferrograde, tin, and tungsten, among other commodities, the exportation of which the Government expressed concern. Explaining that since the outbreak of the war in Europe foreign purchasers have attempted to obtain supplies of these strategic materials, the departments pointed out that such sales are condemned "by the more patriotic and responsible dealers and manufacturers

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in the United States who are cooperating with the Army and Navy Munitions Board in its effort to increase the supply of these materials within the country."

Some Exports Imprudent

The announcement characterized as "imprudent" shipments to foreign countries of "those materials which can be replaced only by imports," and emphasized that it is becoming increasingly difficult and expensive to secure even the minimum imports of many of the materials listed."

The only power vested in the Government by law for specifically restricting exports pertains to shipments of tin plate scrap under an act passed in February, 1936 "to provide for the protection and preservation of domestic sources of tin." Administered by the Munitions Control Board, the law empowers the board to grant licenses for the exportation of tin plate scrap upon conditions and regulations prescribed by the President with the advice and consent of the board, taking into consideration the public interest and the interests of producers.

Products classified as arms, ammunition and implements of war which must be registered before shipment abroad, although the State Department has no authority to restrict their exportation, are divided into these categories:

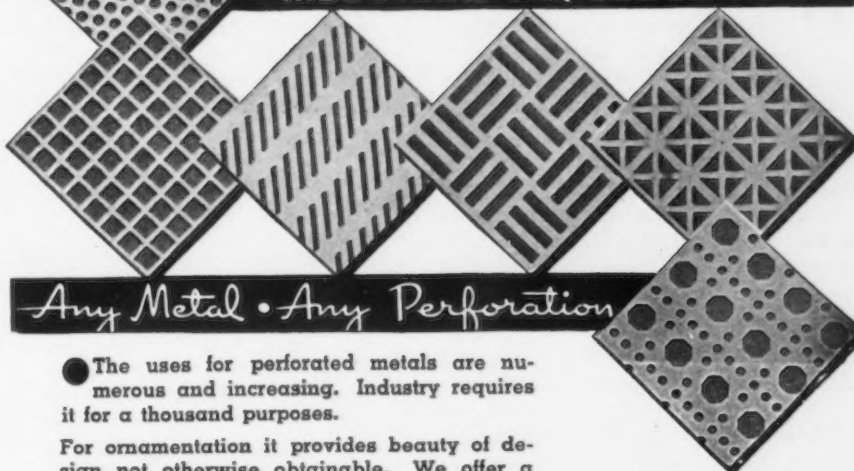
(1) Guns, ammunition, bombs, and tanks; (2) vessels of war and armor plate for such ships; (3) combatant aircraft; (4) revolvers and ammunition; (5) aircraft other than those listed above, and aircraft engines, parts and related equipment; (6) projectors, flame throwers and poison gases; and (7) propellant powders and high explosives.

Manufacturers, exporters and importers of component parts of these items are not required to register with the State Department but registration is mandatory for the exportation of forgings, castings, and machined bodies which have reached such a stage in manufacture that they are clearly identifiable as component parts of arms, ammunition, and implements of war.

MILWAUKEE—Kearney & Trecker Corp. has started a monthly dividend for employees. The first payment in January amounted to about 9 per cent of regular earnings over the entire organization which includes shop and white collar help. Besides increasing employee earnings the plan is calculated to reward efficiency and cooperation and is based on certain efficiency factors.

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	6150	

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"A" 15	"B" 3X	"B" 5	"M" Temper

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Ickes' Removal of Mines Bureau Director Stirs Industry, Congress

WASHINGTON—Dismissal by Secretary of the Interior Harold L. Ickes of Dr. John W. Finch, director of the Bureau of Mines, has aroused resentment among industrial and mining interests, as well as in Congress. Recognized internationally as an outstanding engineer and geologist, Dr. Finch has rendered conspicuous service as head of the bureau and his ability is conceded even by Mr. Ickes. The latter's explanation for the purge of Dr. Finch, instead of being accepted at face value, has only aggravated the situation and is held to be disingenuous.

Complete light on his discharge is not expected to be revealed until Dr. Finch issues a promised statement when he leaves the Government service on Feb. 1 to take a position with a mining interest in New York. Meanwhile the view widely prevails that Dr. Finch was asked to resign because, rather than lacking "iron in his blood," as Mr. Ickes charged, he had too much iron in his blood to subordinate his views as a scientist and public official to the will of Mr. Ickes.

Refused to Back CIO Bill

It is well known that Dr. Finch refused to approve certain Ickes-sponsored legislation, including a CIO bill providing for inspection of coal mines by the Interior Department, and measures for Federal control of the oil industry. It is reported also that Mr. Ickes was unable to get the bureau's approval of Mr. Ickes' proposal for a cut in the tariff duty on zinc. Secretary Ickes said his trouble with the bureau started when it approved the sale of helium to Germany, and later tried to "sabotage" his refusal to permit the sale, a difference that took place before the outbreak of the European war.

By his statement that Dr. Finch lacked "iron in his blood," the secretary said he meant the director was unable to control "a bureaucratic clique" protected by the Civil Service regulations. Any attempts to oust them, Mr. Ickes declared, would necessarily result in trials. He charged that the "clique" was trying to sabotage his policies and if they were not under Civil Service he would ask members of the clique to resign.

His remarks brought a sharp rejoinder from the Civil Service Commission, which did the unusual thing

of issuing a statement rebuking a cabinet officer. Chairman Ramspeck of the House Committee on Civil Service branded Ickes remarks as "astounding" and said the secretary showed an apparent lack of knowledge of the Civil Service law and regulations.

No Basis in Fact

"This statement," said the Civil Service Commission, referring to Mr. Ickes' assertion that the "clique" is protected by the Civil Service, "has no basis in fact. Such statements by high ranking administrative officials can have no other effect than to unjustifiably discredit the Federal merit system."

The commission statement was signed by its members, consisting of Chairman Harry B. Mitchell, Mrs. Lucille F. McMillin and Arthur S. Fleming.

"In recent years," the commission continued, "one of the 'favorite untruths of the spoilsmen' (a phrase used by Theodore Roosevelt when he was a member of the commission) is to allege that a person who receives a classified civil service status remains on the payroll for life."

"An administrator who desires to remove an employee in his department who is inefficient and who seeks to obstruct the established policies of the department has all the leeway one can ask for. He is both the judge and the jury."

Administrator Has Advantage

The commission pointed out, as did Representative Ramspeck, that the only thing the administrator has to do is to serve the employee with written charges and give him an opportunity to reply in writing. No hearing or trial is necessary. If the employee is held to be guilty he can be dismissed or otherwise dealt with. There is no appeal for the employee unless proof can be given that his removal was for political or religious reasons.

"Any administrator who alleges that it is impossible for him to deal with an administrative situation in his own agency because of civil service rules or regulations is attempting to explain his own unwillingness to act by providing the public with misinformation."

Mr. Ickes vigorously denied that Dr. Finch was discharged because the director was a member of a group of

engineers who promoted the candidacy of Mr. Hoover for President.

"I recommended Mr. Finch to the President for appointment and knew at the time he was a member of an engineering committee set up in 1932 by Mr. Hoover," Mr. Ickes said. "I would not now berate him for being favorable to Mr. Hoover."

The "resignation" of Dr. Finch should not be construed as a first step toward a purge of the Bureau of Mines, Mr. Ickes said.

"I don't expect to can anybody else," he added, indicating that those he would like to oust are protected in their positions by the Civil Service.

But he insisted that the new director he will appoint will either have "iron in his blood" or if he does not, "I'll get a man who has it."

It is certain that when the name of the new appointee comes before the Senate, he will be confirmed, if at all, only after a thorough airing of the situation leading to the abrupt discharge of Dr. Finch.

USHA Loan Contracts Approved by President

WASHINGTON—The United States Housing Authority last week received Presidential approval of loan contracts aggregating \$47,947,000 to be made to 24 local housing authorities. These loans, expected to defray 90 per cent of the estimated \$53,292,000 cost of 41 low-rent housing projects, comprised the largest monthly list of loan contracts to be made since the inception of the USHA program. Loan contracts made under USHA now total \$581,996,000.

NLRB Orders 2 Elections Involving Steel Unions

WASHINGTON—The National Labor Relations Board has called a secret ballot election at the plant of the General Metals Corp., Vernon, Cal., to permit production and maintenance employees to vote for or against the Amalgamated Association of Iron, Steel, and Tin Workers Union through the SWOC, CIO affiliate.

At another scheduled election at the Gary, Ind., plant of Standard Steel Spring Co., production and maintenance employees will vote for the SWOC's Iron, Steel and Tin Workers Union, for the AFL's International Brotherhood of Blacksmiths, Drop Forgers and Helpers, or for neither.

Recall of Edison Letter Urging More Power for F.D.R. is Hinted

WASHINGTON—Secretary of Navy Charles Edison, who recommended to Congress last week that the President be empowered under a declared emergency during times of peace to exercise wartime powers in the procurement of ships, materials and in commandeering of factories, was described this week by sources close to the Navy Department as desirous of recalling the recommendation on the ground that it did not represent his views on the subject.

The recommendations, it was pointed out, were contained in a letter sent to Congress last September but never made public because the matters properly before the special session at that time were exclusively confined to the repeal of the arms embargo provisions of the neutrality law. Mr. Edison was represented as having passed the communication on to Capitol Hill in a routine manner together with other letters which were understood to have been written by other officials in the Department. It was also reported that the new Secretary of Navy may yet recall the letter and in any event would not push the recommendation in Congress.

The proposal submitted by the Secretary, the purpose of which was described as necessary to vest with the President during a national emergency those powers which he has in time of war so that "confusion and pandemonium" could be avoided, came as a complete surprise to those who have been watching closely the development of the Government's industrial mobilization plans. Interpretations placed on the letter varied but to some observers it was indicative that some Government officials apparently believed last September that the possibility for United States participation in a war was great.

Emergency Power

Appearing last week before a House Naval Appropriations Sub-committee, Secretary Edison sought to minimize the letter by pointing out that the power sought was one which the President already had in wartime and originally had for use in national emergencies. The latter use of the power, he testified, was limited to emergencies arising prior to March 1, 1918, and had been eliminated from the law after that date.

Recent Awards By War Department

WASHINGTON—The War Department awarded the following contracts during the two-week period ended Dec. 15:

Under the artillery ammunition program—Doehler Die Casting Co., Pottstown, Pa., ammunition parts, \$2,750; A. B. Farquhar Co., Ltd., York, Pa., ammunition parts, \$2,508; Stewart-Warner Corp., Chicago, \$159,080; Scovill Mfg. Co., Waterbury, Conn., ammunition parts, \$121,260; National Tube Co., Pittsburgh, ammunition parts, \$1,904; Pennsylvania Forge Corp., Tacony, Philadelphia, tube forgings, \$8,348.

Under the artillery materiel program—Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., data transmission systems, \$375,210 and carriage equipment, spare parts for gun mounts, \$53,607; Baldwin Locomotive Works, Philadelphia, mounts for guns, \$1,114,454; General Drop Forging Co., Inc., Buffalo, forgings for guns, \$1,575.

Under the rehabilitation machinery program—Monarch Machine Tool Co., Sidney, Ohio, engine lathes, \$53,178; Pratt & Whitney Division, Niles-Bemont-Pond Co., Hartford, Conn., geared head engine lathes, \$40,168; deep hole drill grinding machine, \$1,415; Llovd & Arms, Inc., Philadelphia, geared head engine lathes, \$23,770; American Tool Works Co., Cincinnati, geared head engine lathes, \$19,128; Oliver Instrument Co., Adrian, Mich., grinding machine, \$1,665; Brown & Sharpe Mfg. Co., Providence, R. I., universal cylindrical grinding machine, \$5,120; universal grinding machines, \$18,025; automatic milling machines, \$65,105; automatic screw machines, \$27,138; Cin-

cinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, cylindrical grinding machine, \$5,249, automatic milling machines, \$50,129.

Toledo Machine & Tool Co., Toledo, trimming press, \$2,624; Worthington Pump & Machinery Corp., Harrison, N. J., hydraulic pump, \$14,030; Niagara Machine & Tool Works, Buffalo, punch presses, \$1,546; H. R. Krueger & Co., Detroit, workholding fixtures, \$10,160; American Foundry Equipment Co., Mishawaka, Ind., cleaning machine, \$6,381; C. C. Bradley & Son, Inc., Syracuse, N. Y., horizontal helve hammers, \$4,224; The M. K. Epstein Co., Springfield, Mass., gas fired furnaces, \$3,261; Billings & Spencer Co., Hartford, Conn., drop board hammers, \$26,681; Thompson Grinder Co., Springfield, Ohio, broach sharpener, \$6,015.

The Cleveland Universal Jig Co., Cleveland, drilling head and rotary index tables, \$3,553; Stanley F. Rockwell Co., Hartford, Conn., continuous furnace, \$16,000; The Oilgear Co., Milwaukee, Wis., broaching machines, \$12,816; Stedfast & Roulston, Boston, sliding bed gap lathe, \$17,281, horizontal boring mills, \$176,820, cylindrical grinder, \$5,014; Austin Hastings Co., Inc., Cambridge, Mass., 12 in. precision engine lathes, \$16,048, precision lathes, \$72,648; Lynd-Farquhar Co., Boston, swivel head milling machine, \$6,521; The Hendey Machine Co., Torrington, Conn., universal shapers, \$9,000; The Cincinnati Shaper Co., Cincinnati, plain shapers, \$6,134.

Rivett Lathe & Grinder, Inc., Boston, 10x12 in. precision lathes, \$2,226; Henry Prentiss & Co., surface grinders, \$9,781, radial drilling machines, \$18,055; The Lapointe Machine Tool Co., Hudson, Mass., tool broach grinder, \$3,434; Norton Co., Worcester, Mass., plain cylindrical grinder, \$46,382; Landis Tool Co., Waynesboro, Pa., universal cylindrical grinders, \$12,370; Bryant Machinery Engineering Co., Chicago, drilling machine, \$3,027.

Under special machinery program—

Peters Engineering Co., Philadelphia, \$3,600; The Waterbury (Conn.) Farrel Foundry & Machine Co., gaging machine, \$9,375, primer manufacturing equipment, \$6,000; The Canister Co., Phillipsburg, N. J., mouth annealing machine, \$1,442; Barber-Colman Co., Rockford, Ill., hobbing machine, \$5,360; Pratt & Whitney Division, Niles-Bemont-Pond Co., Hartford, Conn., chambering machine, \$7,816.

Under inspection gages program—R & M Mfg. Co., Royal Oak, Mich., gages, \$1,116; Barker Tool Die & Gauge Co., Detroit, gages, \$1,231; Sheffield Gage Corp., Dayton, Ohio, gages, \$1,256.

Under the Air Corps purchasing program—United Aircraft Corp., Hamilton Standard Propellers Division, E. Hartford, Conn., propeller assemblies and control assemblies, \$1,148,009; Air Associates, Inc., Garden City, N. Y., airplane mooring kits, \$88,806.

Government Steel Orders

WASHINGTON — Government contracts for iron and steel products, as reported for the week ended Dec. 30 by the Labor Department's Public Contracts Division, totaled \$386,167. For the same period, contracts for non-ferrous metals and alloys aggregated \$1,425,036; and for machinery \$570,170. Details follow:

Iron and Steel Products

Bethlehem Steel Co., Bethlehem, Pa., War Engineer Corps, steel sheet piling	\$10,732
United States Steel Products, Washington, D. C., War Engineer Corps, shelter searchlight equipment	11,462
J. C. Busch Co., Milwaukee, War Engineer Corps, multilith tables	13,860
Wm. Scrimgeour, Washington, D. C., War Medical Corps, utensils	12,763
The Patent Scaffolding Co., Inc., Philadelphia, Philadelphia Navy Yard, staging bents	20,207
Keystone Bolt & Nut Corp., New York City, Norfolk Navy Yard, bolts ..	12,609
Phillips & Buttorff Mfg. Co., Nashville, Tenn., War QMC, heating stoves	20,255
A. B. Murray Co., Inc. (Regular Dealer), Brooklyn, N. Y., War QMC, boiler tubes	15,656
Widin Metal Goods Co., Garwood, N. J., War Signal Corps, mast base ..	9,678
National Electric Products Corp., Pittsburgh, Interior, steel pipe ..	25,000
Bethlehem Steel Co., San Francisco, Interior, reinforcing steel	160,422
Columbia Steel Co., Seattle, Puget Sound Navy Yard, steel, plate and angles	11,922
Lehigh Structural Steel Co., New York City, Panama Canal, gate track templates	13,796
Garcia Hermanos, Inc., Bayamon, P. R., PRRA, fence	13,618
Lalanc & Grosjean Corp., Woodhaven, Brooklyn, N. Y., War Medical Corps, utensils	17,700
American Locomotive Co., Railway Steel Spring Division, New York City, War Ordnance, springs, operating rod	16,484

Non-Ferrous Metals and Alloys

Bart Laboratories, Belleville, N. J., War Engineer Corps, mirrors, searchlight	\$132,600
Bridgeport Brass Co., Bridgeport, Conn., War Ordnance, cartridge cases	716,800
The American Brass Co., Waterbury, Conn., War Ordnance, cartridge brass cups	191,700
The American Brass Co., Waterbury, Conn., War Ordnance, cartridge brass disks	110,940
Aluminum Cooking Utensil Co., New Kensington, Pa., War QMC, pots, stock, aluminum	21,250
Aluminum Products Co., LaGrange, Ill., War QMC, pots, stock, aluminum	30,798
Kennecott Sales Corp., New York City, Puget Sound Navy Yard, copper ..	14,910
American Brass Co., Waterbury,	

Conn., Boston Navy Yard, copper tubing	12,625
Chase Brass & Copper Co., Inc., Waterbury, Conn., Navy S & A, brass	39,124
The American Brass Co., Waterbury, Conn., Navy S & A, brass, bronze and copper	84,149
Aluminum Co. of America, Pittsburgh, War Air Corps, aluminum alloy	70,129

Other Machinery

Caterpillar Tractor Co., Peoria, Ill., War Engineer Corps, tractors	\$61,983
Koebring Co., Milwaukee, War Engineer Corps, tractors	28,028
Morton Mfg. Co., Muskegon Heights, Mich., D. C. Navy Yard, rebuilding planer	19,700
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Oakley, Cincinnati, War Air Corps, milling machines	31,989
The E. A. Kinsey Co., Cincinnati, War Air Corps, milling machines	31,396
The E. A. Kinsey Co., Cincinnati, War Air Corps, drill presses	49,197
Leland-Gifford Co., Worcester, War Ordnance, tapping machines	20,122
Stedfast & Roulston, Inc., Boston, War Ordnance, gap lathe	17,281
Caterpillar Tractor Co., Peoria, Ill., Navy Marine Corps, tractors	19,900
The Boye & Emmes Machine Tool Co., Cincinnati, Navy S & A, lathe engine	11,029
The Fulton Syphon Co., Knoxville, Tenn., Navy S & A, valves, temperature control	9,456
Worthington Pump & Machinery Corp., Washington, D. C., Navy S & A, air compressors	120,960
Hardie Tynes Mfg. Co., Birmingham, Ala., Navy S & A, air compressors	83,825
Kennedy Van Saun Mfg. & Engineering Corp., New York City, Panama Canal, rock crushing and screening plant	19,286

Cone Automatic Machine Co., Inc., Windsor, Vt., War CWS, screw machine	19,171
Chicago Pneumatic Tool Co., St. Louis, War Engineer Corps, air compressor	14,030
The Oilgear Co., Milwaukee, War Ordnance, broaching machines	12,816

TNEC Will Investigate Machine Tool Industry

WASHINGTON—The Temporary National Economic (anti-monopoly) Committee has decided to review the subject of technological development and its relation to employment and will investigate a large number of industries, including the machine tool industry especially.

The new TNEC case study, to be titled "The Impact of Technological Development upon Employment," is similar to one conducted a few years ago by the Works Progress Administration and is in line with the rather widespread government misconception that technological advances have been responsible for displacing labor. Several bills have been introduced in Congress during the past few years to

further investigate the subject and extensive hearings were conducted on two of the measures several years ago.

Investigation of reports that the TNEC planned to investigate the machine tool industry disclosed that the contemplated inquiry involving the industry was in connection with the case study on technological advances.

Iron-Steel Imports Decline in November

WASHINGTON—Declining 2505 gross tons, imports of iron and steel in November, 1939, totaled 14,379 tons compared with 16,884 tons in October while for the 11 months ended last November incoming shipments rose 54,376 tons to 272,227 tons from 217,851 tons in the corresponding period of 1938. Of the November, 1939, imports, Canada was the largest supplier, furnishing 6215 tons. The principal items from Canada were 3226 tons of spiegeleisen, 1426 tons of rails and track material and 1217 tons of pig iron.

Structural shapes constituted the largest item of importation during the 11 months ended last November with shipments amounting to 38,398 tons compared with 35,768 tons during the corresponding period of 1938 when structural shapes also were the largest item of importation. Pig iron ranked second in both periods, aggregating 37,274 tons during the 11 months of 1939 compared with 31,851 tons during the corresponding period of 1938.

Two More NLRB Rulings Favor CIO Affiliates

WASHINGTON—The National Labor Relations Board has ordered the Alloy Cast Steel Co., Marion, Ohio, "upon request," to bargain with the Amalgamated Association of Iron, Steel and Tin Workers, CIO affiliate, as the sole collective bargaining representative of all the company's hourly paid production and maintenance employees.

Another board order, based upon an agreement of settlement, directed the Kirkham Engineering & Mfg. Corp., Farmingdale, N. Y., to stop discouraging membership in the Local 661, Aircraft, United Automobile Workers, (CIO), or any other labor organization by discrimination against employees with regard to hire, tenure or any condition or incident of employment.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



(Forced out of last issue)

New Deal, Not Machine, Greatest Bar to Recovery, NAM Head Says

THE implication in President Roosevelt's annual message that invention takes jobs away is challenged by H. W. Prentis, Jr., president, Armstrong Cork Co., in his first official statement as 1940 president of the National Association of Manufacturers.

Describing "the indiscriminate anti-business attitude of our federal administration" as "the greatest hindrance to recovery," Mr. Prentis asserted "our task today is not, as Mr. Roosevelt says, one 'of finding jobs faster than invention can take them away' but one of putting inventions to work to create new industries and new jobs."

"Industry," he added, "is not shirking its part of the job" and "given the support and confidence of Government, it will provide new plants and new work."

Mr. Prentis contrasted Mr. Roosevelt's comment on invention with the plans of 15 major industrial areas over the country for commemoration next month of the 150th anniversary of the American patent system by honoring as modern pioneers nearly 1000 inventors whose achievements in recent years have created new industries and many hundreds of thousands of new jobs.

The inventors have been nominated by employers or others for distinctive awards to be given by the National Association of Manufacturers, the awards to be made locally at a series of banquets over the country culminating in a national Modern Pioneer's dinner in New York on Feb. 27.

"Over the long run and throughout the history of the American patent system," declared Mr. Prentis, "invention has created infinitely more jobs than have been destroyed by technological improvements."

"There are a few facts that bear repeating. Eighty-four per cent of all machines invented are 'labor serving' rather than 'labor saving'—designed to create entirely new products, render new services or improve old products or services."

"One out of every four persons employed in America today hold jobs depending on 14 industries unknown in 1870. Over 100,000 new products have appeared on the American market since 1900."

"Between 1900 and 1930, the period of most intensive development of ma-

chinery in this country, the population increased by 47 millions or 62 per cent while the number of jobs increased by 20 millions or 68 per cent."

"Persons employed in manufacture increased from 5,719,137 in 1900 to 10,176,000 in 1929—or, in other words, almost doubled."

"Manufacturing industry today, according to a recent survey, is employing more workers than it did in 1929."

"Most significant is the fact, attested even by Government authority, that employment today is nearest normal in the most highly mechanized industries and unemployment is most pronounced in the least mechanized occupations."

"Of course, just as no great permanent good is ever accomplished without some suffering, technological advances not infrequently cause temporary dislocation of employment and individual hardship. The cushioning of employment against such shocks is one of the major objectives of manufacturing industry."

Inland's Appeal on New NLRB Testimony Denied by Court

CHICAGO—The United States Circuit Court of Appeals last week denied the petition of the Inland Steel Co. to accept as evidence in its pending case with the NLRB, testimony given before the House committee investigating the labor board. The decision of the circuit court as to whether Inland must obey the board's ruling to recognize the SWOC, is expected shortly.

Australia's Steel Output Advances to New High

WASHINGTON—Australian production of iron and steel from July through October this year reached a record-high figure, according to reports received by the Commerce Department, with the combined output of the Newcastle works, Broken Hill Proprietary Co., and the Port Kembla works, Australian Iron & Steel Co., totaling 452,335 tons of pig iron and 459,266 tons of steel ingots. These figures compared with 358,441 tons and 359,645 tons, respectively, for the comparable period in 1938.

The report said that exports of

manufactured and semi-manufactured iron and steel from Australia during the quarter ended Sept. 30, 1939, reached a value five times the corresponding total for 1938. It was indicated, although official information was lacking, that the bulk of these exports were consigned to Great Britain, Singapore and India.

Brazing Aluminum Alloy Parts

(CONTINUED FROM PAGE 35)

temperature, in addition to that required for the parts to be brazed, it is more economical to design the parts so that the assembly is held in alignment by the fit of the parts or aluminum rivets, or by a beading or clinching operation. Spot welding can also be used to advantage in those cases where the flux can be applied after the spot welding. Tack welding with a torch is also frequently used.

Sufficient information is not yet available on joint clearances to establish specific dimensions; and for the present at least these clearances should be developed by trial. Experiences indicate, however, that these clearances will not differ greatly from those commonly used on ferrous materials with the possible exception that the clearances should be slightly greater.

Corrosion Resistance

In considering the performance of brazed joints from the standpoint of mechanical strength or resistance to corrosion, actual experience is not yet available from which to draw final conclusions. It should be possible to develop the strength in the joints substantially as shown in Table 1 for the various alloys concerned. Pressure tests on some applications have shown that the joints are sufficiently sound to handle at least 90 lb. per sq. in. air pressure. This can probably be exceeded considerably. Other tests with water have been carried up to 1700 lb. per sq. in. hydrostatic pressure without leaking. No difficulty from the standpoint of tightness is anticipated.

In considering resistance to corrosion it is desirable that the filler materials used be aluminum alloys. It follows that the electrolytic potential between the filler material and the parent material is not so great as between entirely dissimilar metals, and electrolytic corrosion from this source should not be severe.

New Power Transmission Equipment

(CONTINUED FROM PAGE 41)

Worm shafts are carried in ball thrust and roller radial bearings in the larger speed reducers.

Automatic Centrifugal Clutch

A POSITIVE acting, automatic centrifugal clutch suitable for all types of industrial power drives has recently been developed by *Dawes Equipment, Inc.*, 2280 Penobscot Building, Detroit. Essentially, the D-E clutch consists of the housing drum, or driven member, the expansion body or driving member and a friction lining band floating between the other two units—all inclosed by a steel cover plate. The expansion body consists of six segmental metal blocks mounted on radial posts extending from the driving hub and connected by tension springs. At rest, the clutch is disengaged, and as the speed of the driving shaft increases, the segment blocks move outward and increasing centrifugal force is applied gradually against the friction lining of the housing drum. The clutch is said to operate indefinitely without maintenance and no lubrication is required.

The clutch can be built to engage smoothly at any desired speed and for any horsepower. Most industrial requirements are served by six sizes of shaft diameters from 1 to 2 $\frac{3}{8}$ in. for horsepowers up to 125. The horsepower transmitted increases directly as the cube of the speed. The unit functions both as a clutch and as a flexible coupling on direct drives. It is especially advantageous where starting loads are heavy, and for internal combustion engine drives, with low torque at low speeds. In the latter application, at idling speeds, the engine is automatically disconnected.

Improved Roller Chain

SEVERAL improvements have been made in the channel lubricated roller chain introduced several years ago by the *Morse Chain Co.*, Ithaca, N. Y. Rollers, turned out of alloy bar stock, are now hardened and ground for greater accuracy and wear life. The cross-section of the side plates has been increased, giving the standard chain the strength of conventional heavy duty sizes. The Morse patented spring lock cotter, claimed not to loosen with any amount of vibration, is retained and is optional at no extra cost. In this round pin roller chain, diagonal

channels are rolled into the stock from which the bushings are formed. When the joint is assembled, these channels appear as spiral grooves and extend through the side plates of the bushing link. The channels act not only as reservoirs but as paths for the flow of oil from the surfaces of the side plates and down to the pins where the lubricant is spread by capillary action. Service life is said to be greatly increased by positive lubrication of the parts of a roller chain that ordinarily fail first. These chains are built to American standards.

Heat-Treated Industrial Gears

A COMPLETE line of heat-treated gears for heavy-duty industrial application has been announced by the *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. These gears, heat treated by the Barnes process, are especially designed for long life and dependability under adverse operating conditions, such as in cranes, mine hoists, locomotives, and in rubber, flour, cement, quarrying, and metal-mining machinery. Heat treatment by the Barnes method gives the gears a hard wearing surface, tapering off to an extremely tough core, giving high shock resistance. Gears in this new line are said to have approximately four times the life of an untreated gear or pinion under the same service and operating conditions. The rate of wear is nearly constant throughout useful life.

Neoprene Transmission Belts

AFTER three years of research, *Hewitt Rubber Corp.*, Buffalo, is now manufacturing an all-neoprene friction surface transmission belt, which will withstand the destructive action of mineral oils. Hitherto, a disadvantage in the use of rubber belting has been the "wearing" action of mineral oils on rubber friction compounds with the result that rubber belts have not rendered the service desired in machine shops and in other fields where oil or cutting compounds come into contact with transmission belting. In these Hewitt Duroil Hewprene transmission belts, the friction and skim coats of du Pont neoprene artificial rubber between all plies is said to provide high flexing life over high speed pulleys. The friction and skim coats protect the cotton duck against wear,

ply separation and softening from oil at high temperatures. Such belts when exposed to oil require less take-up and maintenance supervision than rubber belts due to low stretch as a result of their oilproof quality. They hold wire fasteners exceptionally well under severe working conditions, the makers state. Initially, such oilproof belts had only the outside plies impregnated with neoprene. Now, the entire belt, through a special bonding technique, is neoprene.

V-Belt Fasteners

THE V-belt fastener announced two years ago under the trade name Alligator by the *Flexible Steel Lacing Co.*, 4607 Lexington Street, Chicago, and applied principally in the railroad field, has been modified for use with B, C and D section V-belts of crosswoven fabric core construction. The fastener cannot be applied to belts with cord cores, however. The field of application of V-belts is thereby widened by eliminating the restrictions imposed by the endless feature of conventional belts.

The fastener has two die formed steel end plates held onto the ends of the belt by specially formed flat nails which enter the belt with their flat sides parallel to the belt length. Each half of a fastener has its bushing and rocker pin, and the two halves are joined by flat links. The use of a rocker pin at each end of the connecting link materially reduces the bend of the belt behind the end plates as the fastener passes around the sheave, thereby increasing the belt life. Friction wear of the parts is kept low as the only internal movement is at the knife edges of the rocker pins. The end plates are narrower than the belt so that no metal comes in contact with the sheaves.

No Unemployment Payments To Seaman Body Strikers

MILWAUKEE—The Wisconsin industrial commission has reaffirmed the finding of a deputy commissioner that 2000 employees of the Seaman Body division of Nash-Kelvinator Corp. are not entitled to \$75,000 compensation as result of their unemployment last October when CIO employees of the Nash concern in Kenosha, Wis., went on a strike. The commission pointed out that Wisconsin statutes forbid payment of unemployment compensation to employees of one establishment who are idle because of a labor dispute.

United Engineering to Build Mill for Acme

PITTSBURGH—United Engineering & Foundry Co. has received an order for a complete four-stand four-high tandem cold reduction mill with auxiliary equipment for the Acme Steel Co., Chicago.

A wide variety of gages of steel is to be rolled on this mill and an unusual speed variation of the roll stands is required. Many other outstanding features not commonly found on a tandem cold mill will be incorporated to meet Acme Steel's specific requirements in cold rolling an extensive list of products.

The mill will be equipped with a novel means for entering the strip in the work rolls and guiding its lateral displacement across the face of the rolls irrespective of strip width, thereby allowing uniform roll wear. The tension reel at the delivery end will be equipped with a belt wrapper so arranged as to receive the narrow stock regardless of its position in the mill.

Change gear units are incorporated in the drives of the first two stands with all stands having a 3:1 speed range of the driving motor.

"Steel Serves the Farmer" Ready for Distribution

"STEEL Serves the Farmer," a pictorial story of the steel industry's contributions to the development of labor-saving and crop-saving implements, is being distributed to interested persons and organizations by the American Iron and Steel Institute, 350 Fifth Avenue, New York.

Steel became the servant of the farmer because its strength, durability and low cost made it the ideal material for manufacture of farm equipment, the booklet notes. "Steel Serves the Farmer" includes more than 120 photographs.

Ducommun Metals Completes New Warehouse

CLIMAXING 90 years of successful business in the Southwest and more particularly in southern California where it was founded in 1849, Ducommun Metals & Supply Co. has erected a modern warehouse at 49th and Alameda Streets in Vernon, Cal.

To be used as a storehouse and distributing center for a large stock of iron, steel, non-ferrous metals, and pipe, valves, and fittings, the new plant

covers 228,000 sq. ft. The main building is of all-steel construction and is 290 ft. wide by 600 ft. long.

Albert C. Martin was the architect, the steel was fabricated and erected by Consolidated Steel Co. and the general contractor was Pozzo Construction Co.

49th Steel Institute Meeting to be Held May 23

THE 49th general meeting of the American Iron and Steel Institute will be held at the Waldorf-Astoria, New York, on Thursday, May 23. Attendance at all sessions of this meeting and at the banquet again will be restricted to individual members of the institute.

Program and further details of the meeting will be issued at a later date. Members are urged to make early hotel reservations.

1250 to Attend Engineers Banquet at Pittsburgh

PITTSBURGH—More than 1250 engineers, industrialists, and other executives will attend the annual banquet of the Engineers Society of Western Pennsylvania to be held at the William Penn Hotel on Feb. 5.

Speakers include Philip D. Reed, chairman of the board, General Electric Co., New York, and Congressman Charles A. Eaton, New Jersey. The association's new president for 1940, F. J. Chesterman, vice-president, Bell Telephone Co. of Pennsylvania, will be the presiding officer, and Avery C. Adams, vice-president of sales, U. S. Steel Corp. of Delaware, will be toastmaster. Chairman of the entertainment committee is William Wigham, Jr., Carnegie-Illinois Steel Corp.

This Week in Washington

(CONTINUED FROM PAGE 48)

that they be read carefully and added that "after you have done so, you can then place the responsibility for the division which has been created within the ranks of labor, where it properly belongs."

In its report on the split between the AFL and the CIO, the board said that in 43 cases in which there was important disagreement upon the appropriate collective bargaining unit, the AFL was upheld 16 times and the CIO 19 times, while contentions of

each were upheld in part seven times with no decision necessary in one instance.

"The board has continued during the fiscal year to decide these and other issues created by the split between the AFL and the CIO, as required by the statute," said the report. "Again, as during the past fiscal year, the conflict has created problems which have taken a disproportionate part of the board's time and energies. The board has no alternative but to decide these issues when presented. The protection to the processes of collective bargaining afforded by the National Labor Relations Act are still vitally beneficial to organized labor. A united labor movement would be in a better position to enjoy the rights protected by the act."

In setting forth its record for litigation the report said that of six cases decided by the Supreme Court one order was sustained in full, two were modified, two were set aside and in the sixth the board's right to withdraw a petition to enforce its order was upheld. The Circuit Court of Appeals, it was stated, decided 36 cases. In 11 board orders were declared to have been enforced in full, in 17 they were enforced with modifications, and in eight they were denied enforcement.

This Week on the Assembly Line

(CONTINUED FROM PAGE 45)

Electric Auto-Lite Co. has aroused considerable interest. This battery is said to have a definite reversal of conventional battery behavior, growing stronger in use, whereas the conventional battery enters upon a slow process of deterioration from the moment it is given its electrolyte. A new type of battery oxide, patented and called "Activite," is used in the battery. It is said to have an electrical capacity far in excess of previous standards and the unusual characteristic of actually increasing its capacity in service.

In addition to the new oxide, Auto-Lite engineers have introduced a spun glass sheet insulation between battery plates. Called "Fibre-Glass," it is porous enough to permit water to pass through it, yet the weave of the spun glass is so close that not even the finest oxide particle can penetrate it. This permits the liquid electrolyte to circulate freely between the plates, yet holds the "Activite" coating so securely that there is none of the oxide "shedding" which in conventional battery construction is blamed as the chief cause of failure.

... PERSONALS ...

CHARLES G. WILLIAMS, formerly vice-president in charge of purchasing and manufacturing operations of the American Chain & Cable Co., Bridgeport, Conn., has been appointed general manager of the John A. Roebling's Sons Co., Trenton, N. J., effective March 1. After his graduation as a mechanical engineer from the Sheffield Scientific School of Yale University, he joined the engineering department of the Terry Steam Turbine Co. in 1908. In January, 1913, he was made purchasing agent of the American Chain & Cable Co. at Oneida, N. Y., and three years later was made general purchasing agent of all the plants of the company. He was made general production manager in 1928 and six years later became vice-president in charge of all manufacturing operations.



FRANK T. KALAS, general sales manager of the Electric Storage Battery Co., Philadelphia, has been elected vice-president. During his long association with the company, Mr. Kalas has served as Washington branch manager, district manager, assistant general sales manager and general sales manager. He has had a long and varied experience in all fields of storage battery application.



C. N. JOHNS, a vice-president of the American Chain & Cable Co., Bridgeport, Conn., has been placed in charge of operations, to take over the duties of C. G. WILLIAMS, who has resigned. Mr. Johns is a graduate of the University of Missouri. He has had many years of experience in the steel industry, particularly in the manufacture of wire and wire specialties. He joined the Page Steel & Wire Co., now a division of American Chain, in 1913. After serving as assistant manager of the Monessen, Pa., plant, he was appointed general manager of the Page Steel division. He has been identified with the company for 27 years.

GEORGE C. MOON, a vice-president of American Chain, has been appointed general manager of sales of the company. He has been identified with the wire rope industry for many years. After operating the George C. Moon Co., he became vice-president of the American Cable Co. when it absorbed the George C. Moon Co. and became associated with the American Chain & Cable Co. about 14 years ago when

that company took over the American Cable Co. His headquarters will remain at 230 Park Avenue, New York.

WILLIAM D. KIRKPATRICK, who has been general manager of sales of the American Chain division, has been elected a vice-president of the American Chain & Cable Co. He has been identified with the company for more than 25 years. He is a graduate of Lafayette College. Mr. Kirkpatrick will make his headquarters at York, Pa.



A. C. CHILDS, formerly manager of sales, sheet and tin plate division, Weirton Steel Co., Weirton, W. Va., has been promoted to the New York district sales managership, succeeding W. M. RECTOR, who has been given an indefinite leave of absence because of ill health.

R. S. MEIGHEN, formerly assistant sales manager, has been made manager of sales of the tin plate division.



W. B. MOORE, associated for 20 years with the Timken Roller Bearing Co., Canton, Ohio, in various sales activities, has been appointed director of sales of the Steel and Tube division. He became identified with the company as an engineer after his graduation in 1919 from the University of Michigan. After several years of en-

gineering and sales training, he was placed in charge of the Pacific Coast district. He has been manager of industrial sales since 1933.

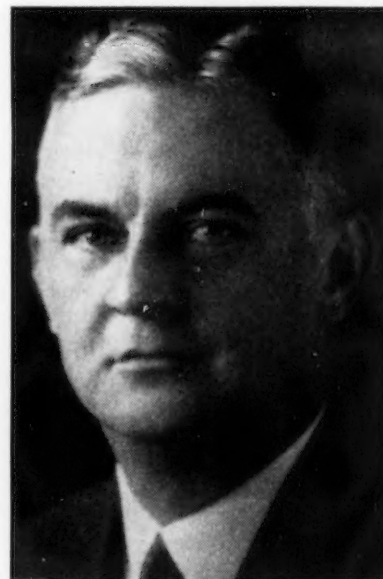
S. C. PARTRIDGE, who has been assistant manager of industrial sales, has been promoted to the managership, succeeding Mr. Moore. Mr. Partridge became associated with the company in 1921 after his graduation as a mechanical engineer. For a number of years he was in charge of the company's automotive and industrial sales in Canada.



HARRY GLAENZER, for 18 years vice-president in charge of engineering of the Baldwin Locomotive Works, has resigned because of ill health. He has been associated with the engineering department for 41 years.



H. A. MATTHEWS, of the Gould Storage Battery Corp., Depew, N. Y., has been elected president of the Railway Electric Supply Manufacturer's Association.



F RANK T. KALAS, new vice-president of Electric Storage Battery Co.



C HARLES G. WILLIAMS, general manager of John A. Roebling's Sons Co.

GEORGE S. CASE, JR., general manager of the Birmingham, Ala., plant of Lamson & Sessions Co., Cleveland, manufacturer of bolts and nuts and allied products, has been elected to the board of directors of the company, replacing the late Chester C. Bolton. Mr. Case represents the fourth generation in an executive capacity in the company. His father, GEORGE S. CASE, SR., is chairman of the board.

JOHN A. DILLON, who for more than 20 years has been associated with the Pittsburgh Screw & Bolt Corp., has resigned the position of vice-president of Eastern sales of that company, effective Jan. 1. Mr. Dillon started in the steel business with the National Tube Co. at Pittsburgh and was later in the New York office of that company, with which he was connected for 13 years before entering the bolt and nut trade.

♦ ♦ ♦

H. B. KRAUT, president and general manager, Giddings & Lewis Machine & Tool Co., and president of the Fond du Lac (Wis.) Association of Commerce, was the principal speaker at the January meeting of the Junior Chamber of Commerce.



C. N. JOHNS, who has been placed in charge of operations of American Chain & Cable Co.

L. A. MULLEN has been appointed assistant manager of sales, Pittsburgh Steel Co., Pittsburgh. He has been associated with this company since January, 1938, first as assistant district sales manager at New York and later as district sales manager at Chicago. Mr. Mullen formerly had been associated with Republic Steel Corp. in various sales capacities for 10 years.

♦ ♦ ♦

W. H. MELANEY, sales manager, National Roll & Foundry Co., Avonmore, Pa., recently retired after a long service of 60 years in the steel industry. A pioneer in roll design and a consistently valuable "trouble-shooter" on roll problems, Mr. Melaney is au-

thor of a treatise on this subject, "Modern Sheet Mill Practice with the Logic of Roll Design."

Widely known throughout the operating end of the steel foundry industry, Mr. Melaney began his career as a roll turner at Portsmouth with the Phoenix Roll Works in 1880 and sub-



G. GEORGE C. MOON, general manager of sales of American Chain & Cable Co.

sequently was in the employ of the former George A. Hogg Co., Pittsburgh, roll maker. For the past 25 years he has been associated with the National Roll & Foundry Co.

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RALPH J. STAYMAN has been appointed manager of the warehouse department, Pittsburgh Bridge & Iron Works, Pittsburgh. He formerly was manager of warehouses for Jones & Laughlin Steel Corp. and previous to that was associated with Joseph T. Ryerson & Sons, Inc.

♦ ♦ ♦

E. R. STETTINIUS, JR., chairman of the board of the United States Steel Corp., has been made a member of the Corporation of Massachusetts Institute of Technology. RALPH E. FLANDERS, president of the Jones & Lamson Machine Co., Springfield, Vt., for three years a term member, has been made a Corporation life member.

♦ ♦ ♦

W. F. SCHULTEN has been appointed to the newly-created position of general traffic manager of the Pittsburgh Coal Co., Pittsburgh. He has served as traffic consultant of a number of



W. WILLIAM D. KIRKPATRICK, new vice-president of American Chain & Cable Co.

companies, including the Illinois Steel Co. and Universal Portland Cement Co. W. P. BUFFINGTON, present traffic manager, will continue in his present duties.

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H. W. COLLINSON, who has been Cleveland district sales manager for the Carborundum Co., Niagara Falls, N. Y., has been made district sales manager of the Chicago office, succeeding F. E. GRIDLEY, who has been granted an extended leave of absence. E. F. KONKER, a member of the sales staff, succeeds Mr. Collinson at Cleveland, and K. C. WOLTZ will cover the territory covered by Mr. Konker.

♦ ♦ ♦

COLMAN CURTISS, JR., who became identified with the Buffalo Bolt Co., North Tonawanda, N. Y., in 1934, has been appointed as assistant to A. M. JONES general sales manager. He started work in the factory, moved into the cost and accounting department in 1935 and joined the sales organization the following year. Mr. Curtiss was graduated from Yale University in 1932.

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CLARENCE G. FOX has been appointed purchasing agent for the Pump Engineering Service Corp., Cleveland, division of Borg-Warner Corp. Mr. Fox was previously with the Marvel-Schebler Carburetor division of Borg-Warner at Flint, Mich.

♦ ♦ ♦

RICHARD S. FALK, public relations director of the Falk Corp., Milwaukee,



WILLIAM S. SAYLOR, manager of sales, Boston District, Carnegie-Illinois Steel Corp.



D. F. McCANDLISH (left), manager of the Detroit district of Air Reduction Sales Co. and G. J. Dekker, new manager of the Oklahoma City district. Notices of their appointment appeared in the issue of Dec. 28.



has been awarded the 1939 distinguished service medal of the Milwaukee Junior Association of Commerce. Falk, who is 27 years of age, won the citation as the result of activities largely in the labor field combined with other civic activities in which he has played a prominent part.

♦ ♦ ♦

CLYDE M. VANDEBERG has been appointed public relations director of Packard Motor Car Co. Mr. Vandenberg handled publicity for the San Diego Fair in 1933 and 1934, the Dallas Fair in 1935 and 1936 and was director of promotion for the Golden Gate International Exposition in San Francisco during 1939.

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JOHN CRAIG, vice-president of the British Iron and Steel Institute, London, has accepted the nomination for the presidency of the institute for two years.

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H. L. JOSEPH HUMPHREY has been named advertising manager of Ex-Cell-O Corp., Detroit, succeeding TOM MOULE, who now is with Seiler, Wolfe & Associates, Detroit.

♦ ♦ ♦

GEORGE T. F. SCHREIBER, general agent, Seaboard Air Line, has been elected to the board of governors of the Traffic Club of Pittsburgh. He succeeds J. R. Barry, who recently resigned because of his transfer as assistant general freight agent of the Louisville & Nashville Railroad.

C. W. BARNES has joined the W. W. Sly Mfg. Co., Cleveland, in charge of sales promotion and advertising. Mr. Barnes has had many years of experience in both sales and sales promotion with well known organizations.

♦ ♦ ♦

T. R. HIGGINS, for the past eight years chief engineer of the New England Structural Co., Everett, Mass., has joined the staff of the American Institute of Steel Construction, as engineer in the New York district. He was formerly structural engineer for Stone & Webster Engineering Corp. and was graduated from Tufts College in 1921.

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HAROLD SWANTON, for the past several years sales manager of Precision Bearings, Inc., Los Angeles, has been elected vice-president, succeeding NORMAN BELL, who has resigned. Mr. Swanton has been identified with the company and its predecessor companies for some 15 years.

♦ ♦ ♦

H. E. RYKER, for the past year assistant works manager of the Lockheed Aircraft Corp., Burbank, Cal., has been appointed general manager in charge of all operations of the Vega Airplane Co., Burbank, a subsidiary of the Lockheed company.

♦ ♦ ♦

EDWARD I. PFAFF, for the past 12 years a special industrial representative of the Alemite division, Stewart-Warner Corp., has been appointed

sales manager of the Trabon Engineering Corp., Cleveland.

R. L. HARTER, who resigned recently as industrial engineer with the Alemite division, has been appointed chief engineer of the Trabon company. He is a graduate of the U. S. Naval Academy.

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W. R. WOOD, who has served as supervisor of tubing sales for the Hamilton Steel Co., Cleveland, has been appointed Chicago district sales representative for the Ohio Seamless Tube Co., Shelby, Ohio, effective Jan. 1. W. J. MILLER succeeds Mr. Wood at the Hamilton Steel Co., distributor for the Ohio Seamless Tube Co.

♦ ♦ ♦

HAROLD W. STODDART, who joined the Worthington Pump & Machinery Corp., Harrison, N. J., in 1919 after his graduation from Iowa State College, has been made manager of the company's turbine well pump division. He has been identified with the manufacture of turbine well pumps since 1921.

♦ ♦ ♦

CHARLES M. POND, CHARLES W. DEEDS, and HUBERT D. TANNER have been elected directors of the Niles-Bement-Pond Co., Hartford, Conn. Mr. Pond who was made vice-president a year ago, has been associated with the company for 31 years and has charge of the small tool and gage division. Mr. Tanner, vice-president, has been with the company 20 years



HERBERT J. WATT, whose appointment as manager of sales, Central area, Carnegie-Illinois Steel Corp., was announced in these columns last week.



HARRY W. SCHUETZ, new assistant to the president and general manager of the Colona division of Pittsburgh Screw & Bolt Corp. Details of his career appeared in these columns last week.



W. T. BUNSCOMBE

and is in charge of the machinery division. Mr. Deeds is president of the Chandler-Evans Corp., airplane parts manufacturer, Meriden, Conn.

♦ ♦ ♦

DR. WILLIAM A. MUDGE, for the past 17 years superintendent of research, superintendent of the refinery and works metallurgist at the Huntington, W. Va., plant of the International Nickel Co., Inc., New York, has been added to the technical service division of the company in New York.

♦ ♦ ♦

T. N. WILDER, formerly assistant to the advertising manager, Carnegie-Illinois Steel Corp., Pittsburgh, has joined the firm of Ketchum, MacLeod & Grove, Inc., Pittsburgh, as account executive. Before joining Carnegie-Illinois, Mr. Wilder was advertising assistant, Jones & Laughlin Steel Corp., Pittsburgh, and previous to that was advertising manager, General Atlas Carbon Co., New York, an affiliate of Cities Service Co.

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BERTRAM G. PARKER, president, Youngstown Foundry & Machine Co., Youngstown, has been reelected president of the Youngstown Chamber of Commerce, one of the few men in the history of the Chamber to be selected for more than one term.

♦ ♦ ♦

WM. S. SAYLOR has been appointed manager of sales, Carnegie-Illinois

Steel Corp.'s Boston district, succeeding **WILBUR S. LOCKE**, who retired Jan. 1 after 47 years of service in the corporation's Boston office.

Mr. Saylor has been connected with the U. S. Steel Corp. subsidiary since 1919 and formerly was assistant manager of sales at Buffalo. He worked for five years at the Duquesne, Pa., works of Carnegie Steel and entered the general sales office in 1924. He later joined the staff of the Cleveland district sales office and had been assistant manager of sales at Buffalo since March, 1936.

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C. C. CARLTON, vice-president and secretary of Motor Wheel Corp., Lansing, Mich., has been made president of the Lansing Safety Council which was recently organized.

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S. D. WILLIAMS has resigned as director of sales of the Steel & Tube division of the Timken Roller Bearing Co., Canton.

♦ ♦ ♦

GEORGE A. BLACKMORE, president, Westinghouse Air Brake Co., Pittsburgh, and Union Switch & Signal Co., Swissdale, Pa., and **ARTHUR W. PAGE**, a vice-president and director of American Telephone & Telegraph Co., New York, and a director of the Continental Oil Co., have been elected directors of Westinghouse Electric & Mfg. Co.

Bunscombe Heads Follansbee Steel

W. T. BUNSCOMBE, associated at various times with the American Sheet & Tin Plate Co., Jones & Laughlin Steel Corp. and McKeesport Tin Plate Co., has been elected president of the new Follansbee Steel Corp., Pittsburgh. The Reconstruction Finance Corp. and banking institutions are making a \$2,100,000 loan for completion of financing in reorganization of the old Follansbee Brothers Co.

A new board of directors includes the following: Frank F. Brooks, president of the First National Bank, Pittsburgh; W. T. Bunscombe, president of the reorganized company; David L. Frawley, tax authority; John Follansbee, trustee and president of Follansbee Brothers Co.; Marcus A. Follansbee, sales manager of Follansbee Brothers Co.; George T. Ladd, trustee of Follansbee Brothers and president of United Engineering & Foundry Co.; William B. Paul, attorney; Lloyd W. Smith, president, Union National Bank of Pittsburgh; Lauson Stone, assistant to president, Jones & Laughlin Steel Corp.; and John H. McCoy, president, City National Bank & Trust Co., Columbus, Ohio. Mr. McCoy will represent the RFC on the Board. John Follansbee will be chairman of the board.

... THE NEWS IN BRIEF ...

Automobile production expected to rebound to about 100,000 units in the current week.—Page 42.

Supreme Court decisions upholding NLRB powers stimulate demand for revision of Wagner Act.—Page 46.

Identical bids received on 10.15 per cent of Government's orders for supplies in 12-month period.—Page 49.

Harnischfeger Corp. and Orton Crane & Shovel Co. get Navy Department awards.—Page 51.

Moral embargoes help neutrality law in limiting U. S. exports, two months' period shows.—Page 53.

Secretary Ickes' removal of Mines Bureau director arouses resentment in industry, Congress.—Page 56.

USHA loan contracts approved by President.—Page 56.

NLRB orders two elections involving steel unions.—Page 56.

Recall of Secretary of Navy Edison's letter urging dictatorial powers for F. D. R. in peacetime is hinted.—Page 57.

Government contracts for iron and steel products in week ended Dec. 30 totaled \$386,167.—Page 57.

Two more Labor Board decisions favor affiliates of CIO.—Page 58.

U. S. imports of iron and steel declines 2505 tons to 14,379 tons in November.—Page 58.

TNEC will investigate machine tool, other industries in study of technological development and employment.—Page 58.

New Deal's anti-business attitude, not improvements in machines, blocks recovery, head of NAM declares.—Page 59.

Australia's steel output from July through October reaches new high level.—Page 59.

U. S. court denies Inland Steel Co.'s appeal for acceptance of new testimony developed in House inquiry into NLRB.—Page 59.

No unemployment payments to Seaman body strikers.—Page 60.

Ducommun Metals & Supply Co., in business 90 years, erects new warehouse in Vernon, Cal.—Page 61.

"Steel Serves the Farmer," pictorial story of steel's contribution to farming, is issued by American Iron and Steel Institute.—Page 61.

American Iron and Steel Institute to hold its 49th general meeting May 23 in New York.—Page 61.

Engineers Society of Western Pennsylvania to hold annual banquet Feb. 5 at Pittsburgh.—Page 61.

United Engineering & Foundry Co. to build four-high cold reduction mill for Acme Steel Co.—Page 61.

British iron and steel exports decline sharply.—Page 69.

Fourth quarter steel ingot output of 16,020,857 tons sets all-time record. Year's total, 45,768,899 tons.—Page 69.

New company to operate Spencer Wire Mills.—Page 69.

Canadian mills carry over large backlogs.—Page 69A.

Canadian steel output at 85.4 per cent in November.—Page 69A.

Large filtration plant awarded at Toledo.—Page 69A.

Canada increasing its war contracts. Business placed in four months totals about \$90,000,000.—Page 69A.

Operations suspended at Laughlin and Shenango tin plate mills of Carnegie-Illinois Steel Corp.—Page 69B.

Pittsburgh Traffic Club's 39th annual dinner will be held Jan. 26.—Page 69B.

Berlin understood to admit officially the "retirement" of Fritz Thyssen, Ruhr steel leader.—Page 69B.

Societa Finanziaria Siderurgica, Rome, will double capital to finance heavy industries.—Page 69B.

Douglas Aircraft Co. books orders for 82 airliners, valued at \$10,000,000, in six months.—Page 69C.

All-welded steel factory is constructed for R. G. LeTourneau, Inc., at Toccoa, Ga.—Page 69C.

Missouri Pacific 1940 tool budget approved by court.—Page 69C.

Kearney & Trecker Corp., milling machine manufacturer, announces \$1,000,000 expansion program.—Page 69C.

Subsidiary of Republic Steel Corp. buys Chattanooga plant for a warehouse.—Page 69C.

Arthur G. McKee & Co. official reports most plant construction inquiries in several years.—Page 69C.

December pig iron output at 89.4 per cent of capacity.—Page 70.

ICC blocks cut in steel trucking rate in Ohio.—Page 70.

Engineering Societies of New England give award to Boston Wire Stitcher Co., East Greenwich, R. I.—Page 90.

Record motor order for power station auxiliary equipment.—Page 90.

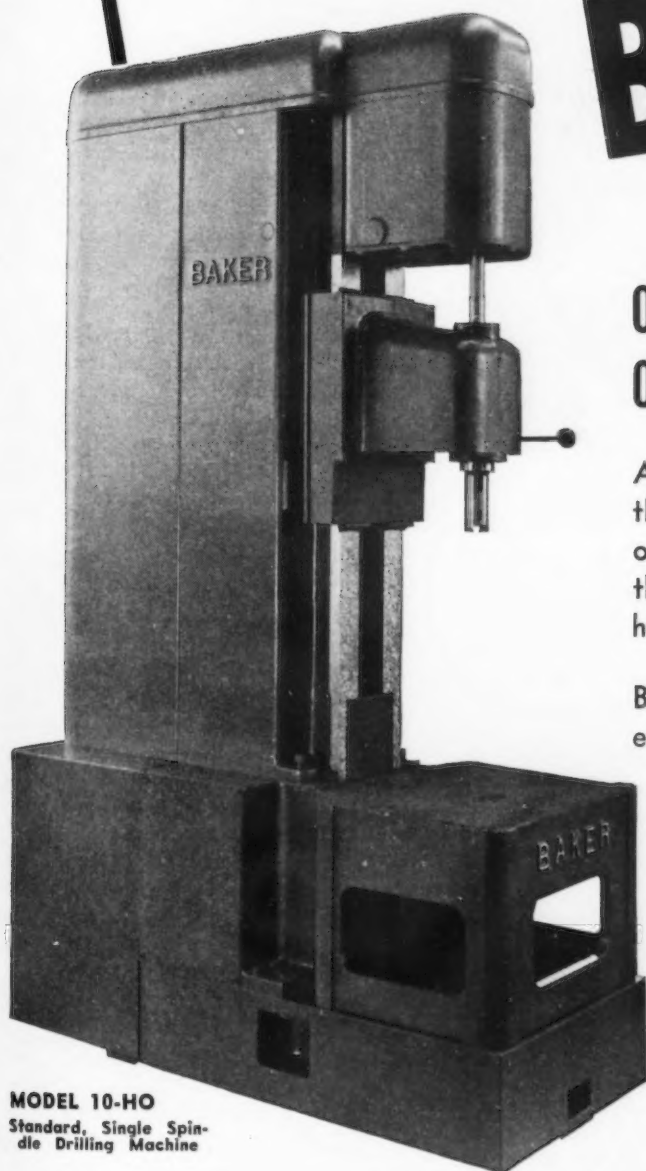
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MEETINGS

- Jan. 9 to 11—Institute of Scrap Iron and Steel, Pittsburgh.
- Jan. 15 to 19—Society of Automotive Engineers, Detroit.
- Jan. 22 to 26—International Heating and Ventilating Exposition, Cleveland.
- Feb. 5—Engineers Society of Western Pennsylvania, annual banquet, Pittsburgh.
- Feb. 8 to 10—Conference of Iron, Steel and Allied Industries, Del Monte, Cal.
- March 7 to 9—American Society of Tool Engineers, annual meeting, New York.

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... OBITUARY ...

AMBROSE N. DIEHL, retired president of Columbia Steel Co., died Jan. 10 at La Jolla, Cal., from bronchial pneumonia following a lengthy illness. He was 63 years old.

His death closed an active career of 40 years' service to the steel industry. After graduating from Pennsylvania Sate College in 1898 Mr. Diehl entered the employ of the Carnegie Steel Co.'s Duquesne works. Rising through the various operating departments he became assistant general superintendent of the Duquesne works in 1915 and operating vice-president in charge of the Pittsburgh district for Carnegie Steel Co. in 1925.

In 1930 he was elected vice-president of United States Steel Corp. and in 1932 was sent to San Francisco to head the Columbia Steel Co. as president. He was well known in club circles and was a member of the Duquesne and University clubs of Pittsburgh, University Club of New York, New York River Club, Rolling Rock Club, Pacific Union Club, Bohemian Club, Burlingame Country Club and the San Francisco Golf Club. He was also a member of the American Institute of Mining and Metallurgical Engineers and the American Iron and Steel Institute.

♦ ♦ ♦

ROBERT M. HIDEY, manager of the Dodge truck plant of Chrysler Corp., died Jan. 2 at Harper Hospital, Detroit, a few hours after he collapsed at the plant. Mr. Hidey was born at Mt. Pleasant, Mich., 55 years ago, was graduated from the University of Michigan engineering school in 1907, and the following year went to Detroit. He was in charge of the experimental division at Packard Motor Car Co. and later was manager of the company's truck division until Packard stopped making trucks. Then he became associated with White Motor Truck Co. of Cleveland. He returned to Detroit to join the Chrysler Corp. five years ago.

♦ ♦ ♦

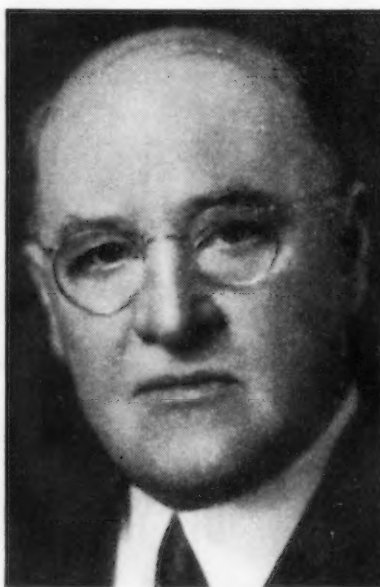
HARRY G. MCKEE, born in Detroit in 1890, died in Muskegon, Mich., on Jan. 4. He had been factory manager of the Air Control Products Corp., Muskegon, since last April.

♦ ♦ ♦

CHARLES A. FISHER, retired president, Jones & Laughlin Steel Corp., Pittsburgh, and, at the time of his death, president of Pitt National Bank, Pittsburgh, died Jan. 5 at his home in Pittsburgh, aged 64 years.

Mr. Fisher's entire career, up to the

time of his retirement from Jones & Laughlin, had been in the steel business. He entered the employ of the Oliver Wire Co. in 1894 and four years later joined Jones & Laughlin as a book-keeper. He later became assistant auditor, auditor, assistant treasurer, treasurer, assistant to the president, vice-president, and finally president.



A. N. DIEHL

retiring in 1928. In 1933 Mr. Fisher emerged from retirement to become president of the Pitt National Bank when it was organized to take over part of the assets of the former Diamond and Monongahela national banks.

♦ ♦ ♦

J. Z. COLLIER, formerly connected in an executive capacity with the Crucible Steel Co. of America, died last week at New York, and was buried in Louisville, Ky. Mr. Collier was born Nov. 12, 1886, at Atlanta, Ga. Before his connection with the Crucible company he was assistant general manager in charge of operations, Jones & Laughlin Steel Corp., Pittsburgh, which position he resigned several years ago. He had served as superintendent of the Southside and Aliquippa plants of Jones & Laughlin previous to becoming assistant general manager, and had also been connected with the Atlantic Steel Co., Wheeling Steel Corp. at Portsmouth, and was exceptionally well known throughout steel operating circles.

♦ ♦ ♦

H. P. TREADWAY, president and treasurer of the Kansas City Bridge Co. until his retirement a year ago,

died last week, aged 65 years. Mr. Treadway was graduated from the University of Michigan in civil engineering.

♦ ♦ ♦

EDWIN W. ALLEN, vice-president of the General Electric Co. since 1926, died at Johns Hopkins hospital, Baltimore, on Jan. 1, after a long illness. He was 61 years old. He entered the employ of General Electric as a student engineer in 1901, one year after his graduation from Virginia Polytechnic Institute. He was located in Schenectady until 1911, when he was appointed engineer of the Central district, with headquarters in Chicago. He remained in Chicago until 1924, when he was transferred back to Schenectady as manager of the engineering department. He was made vice-president two years later. Mr. Allen served in the World War. Following the Armistice he was ordered to duty with the War Damage Board of the Peace Commission as chief engineer to appraise war damages in Belgium.

♦ ♦ ♦

MICHAEL SCHIAVONE, president of Michael Schiavone & Sons, Inc., New Haven, died on Jan. 2. He founded Schiavone & Co. in New York in 1898, now the Schiavone-Bonomo Corp., Jersey City, of which his brother, Louis Schiavone, is president.

♦ ♦ ♦

WILLIAM L. MACRAE, president of Dalrae Tools Co., and MacRae Machinery Co., died suddenly at his home in Syracuse, N. Y., on Dec. 10, aged 47 years. He was born in Scotland and came to this country as a boy. Early in his career he served with the General Electric Co. Later he joined Henry Prentiss & Co. and subsequently went to Buffalo as sales representative for the company. He remained there until 1927, when he took over the agencies for the Kearney & Trecker Co. and the Keller division of Pratt and Whitney Co. Several years ago he formed the Dalrae Tools Co.

♦ ♦ ♦

GEORGE W. SMITH, 71, former superintendent of production for the J. I. Case Co., Racine, Wis., died in Seattle, Wash., Dec. 23. He learned the machinist's trade and worked for the Ingersoll-Milling Machine Co., in Cleveland and Rockford, Ill., from 1897 to 1912. Later he was in charge of the Case tractor plant in Racine, and then became works manager for the Maxwell Motor Co., at Detroit. Returning to Racine in 1915 he again joined the Case company and remained as superintendent of production until his retirement in 1927.

BOUGHTON T. NOBLE, factory manager of Clark Brothers Bolt Co., Milldale, Conn., died Jan. 2, aged 71 years. Mr. Noble had been connected with the company for 56 years, serving as superintendent for 30 years and a director for 20 years.

♦ ♦ ♦

JACOB BRENNER, 75, president of the Jacob Brenner Co., Fond du Lac, Wis., sheet metal products manufacturer, and head of the B-F Blower Co., died at his home on Jan. 1 following an extended illness. He had been active in local business circles for many years, and was a former member of the old city council and the police and fire commission.

♦ ♦ ♦

W. A. CRAMER, 52, vice-president and treasurer of the Wausau (Wis.) Iron Works, died Jan. 3 at St. Mary's hospital in Wausau after a short illness. Mr. Cramer had only recently returned to work following an illness of nearly two years. He had been associated with the Wausau Iron Works since 1916 when he joined as bookkeeper. In 1923 he acquired an interest in the firm and was elected secretary, a post he held until 1933, when the company reorganized. At that time he was made vice-president and treasurer, and also continued as an active participant in the management of the firm until his death.

British Iron and Steel Exports Decline Sharply

LONDON—The British Board of Trade statistical returns for October show that the value of iron and steel and manufactures thereof exported in October reached £1,901,799, a decrease compared with October, 1938, of £1,534,343. Machinery was exported in October to the value of £2,057,805, a drop of £2,781,173 compared with the corresponding month of 1938.

New Company to Operate Spencer Wire Mills

BOSTON—The former Wickwire Spencer Steel Co. mills at Spencer, Mass., closed since 1932, will be reopened shortly by the Harris Wire Works of Spencer, Inc. Equipment will be installed to manufacture high grade specialty wire. Approximately 200 will be employed when production starts. Wire was drawn continuously from 1812 until 1932 when the depression closed the Spencer mills. Frederick T. Harris, Newark, N. J., is president of the new company.

Fourth Quarter Steel Output of 16,020,857 Tons Sets Record

A TOTAL of 5,164,420 gross tons of open hearth and bessemer ingots was produced in December, raising the total for the quarter to 16,020,857 gross tons, the highest quarterly total on record. Previously, the best quarter for steel production was the second quarter of 1929, when output was 15,139,254 gross tons.

Output for the full year 1939 amounted to 45,768,899 gross tons, nearly 65 per cent above the 1938 total of 27,742,225 gross tons. In total tonnage, 1939 was 16 per cent below the peak year 1929 when open hearth and bessemer ingot production totaled 54,312,279 gross tons.

The December output was about 65 per cent above the total of 3,130,746 gross tons produced in December, 1938, while output in the final quarter of 1939 showed approximately the same percentage rise over the final

quarter of 1938, when 9,795,094 gross tons were produced.

Per cent of capacity operated by the steel industry averaged 85.57 per cent in December, 89.30 per cent for the quarter and 64.29 per cent for the year. In 1938 the industry operated at 52.79 per cent of capacity in December, at an average of 55.55 per cent in the final quarter and at an average of 39.65 per cent for the year.

Average weekly production is calculated at 1,168,421 gross tons in December, 1939, as against 708,314 gross tons in December, 1938. Weekly output in the last quarter of 1939 averaged 1,219,243 gross tons, compared with 745,441 gross tons in the corresponding 1938 quarter. For the full year 1939 output averaged 877,808 gross tons per week, as against an average of 532,072 gross tons weekly in 1938.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

1938	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter ..	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter ..	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months..	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.29
August	2,309,207	169,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter ..	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter ..	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.30
1st Quarter ..	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter ..	8,345,945	563,405	9,022,409	693,498	13.01	50.79
1st 6 months..	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	2,893,916	229,380	3,162,534	715,505	4.42	52.40
August	3,469,453	246,952	3,763,418	849,530	4.43	62.22
September	3,881,564	297,128	4,231,310	988,624	4.28	72.41
3rd Quarter ..	10,244,933	773,460	11,157,262	849,753	13.13	62.23
9 Months	27,500,243	1,875,239	29,748,042	762,770	39.00	55.86
October	4,922,070	405,000	5,393,821	1,217,567	4.43	89.17
November	4,990,388	404,556	5,462,616	1,273,337	4.29	93.26
December	4,784,214	315,402	5,164,420	1,168,421	4.42	85.57
4th Quarter ..	14,696,672	1,124,958	16,020,857	1,219,243	13.14	89.30
Total	42,196,915	3,000,197	45,768,899	877,808	52.14	64.29

INDUSTRIAL NEWS FROM CANADA

Canada Increasing War Contracts

OTTAWA—Government officials state that practically all plans and arrangements have now been completed and the awarding of war contracts will mount rapidly from now on, with special pressure being put behind the Commonwealth Air Training Plan. Immediate placing of munitions contract will result in rapid expansion of business of this nature. In the first four months of the war, even including the \$25,000,000 railroad equipment orders, business placed on war account did not exceed \$90,000,000. Placing of war orders on a much larger scale, both for the Canadian and British governments, will be started immediately.

For the week ended Jan. 2, orders valued at almost \$1,300,000 were placed, according to C. D. Howe, Minister of Transport. Of these orders most of the purchases of aircraft and parts were placed with United States firms, chiefly in California. Orders also reveal that some defense materials have been placed in Great Britain. Mr. Howe states that an early start will be made on the shipbuilding program and within a short time he will be able to announce that contracts have been placed with 10 Canadian shipyards, including those at Port Colborne, Collingwood and Port Arthur on the Great Lakes. British experts who have surveyed Canada's shipbuilding facilities, have been impressed with the Dominion's ability to turn out rapidly the smaller type of anti-submarine craft so badly needed now.

War contracts placed during the week included, aircraft supplies and accessories, Northern Electric Co., Ltd., Ottawa, \$67,401; North American Aviation Inc., Inglewood, Cal., \$34,741; Douglas Aircraft Co., Inc., Santa Monica, Cal., \$21,152; British Air Ministry, \$25,000; Noorduynd Aviation Ltd., Montreal, Que., \$18,218; Canadian Marconi Co., Montreal, \$8,196; Aviation Electric, Ltd., Montreal, \$7,465, and Fleet Aircraft, Ltd., Fort Erie, Ont., \$6,420. Marine equipment contracts were distributed as follows: British Admiralty, \$133,739; Halifax Shipyards, Ltd., \$95,832; Canadian Marconi Co., Ltd., Montreal, \$5,140. Construction contracts, orders for

foodstuffs etc., made up the balance of the awards for the week.

Canadian Mills Carry Over Large Backlogs

TORONTO, Ont.—While the usual seasonal slump developed in business in Canada, as in former years, there has been no curtailment in production and operations of the steel industry. Backlogs carried into the new year were at the highest level for many years and will provide orders sufficient to maintain capacity production for the next six months at least. There has been a slowing down in new orders during the past two or three weeks, but local steel interests state that this is just the ordinary year-end letup and look for renewed buying on a large scale before the end of the month. While no price changes were announced in finished and semi-finished steel materials, there have been some minor changes in wire extras, and producers are not quoting prices for long terms ahead. Iron and steel scrap prices have been somewhat erratic with some materials showing a definite softer trend, while others have been marked up slightly.

Large Filtration Plant Awarded at Toledo

TOLEDO—Three contracts covering the \$2,042,185 filtration plant and reservoir for the new Lake Erie water supply system have been awarded. The Jerome A. Utley Co., Detroit, will build the filtration plant; The Pitt Construction Co., Pittsburgh, will build the reservoir, and Romanoff Electric Co., Toledo, will do the electrical work.

Canadian Steel Output At 85.4% in November

STEEL ingot production in Canada in November was equal to 85.4 per cent of capacity, as compared with 84.2 per cent in the preceding month. On a tonnage basis, November output was 147,182 tons, as compared with 149,890 tons in October. The higher percentage figure in face of a smaller tonnage output is due to the fact that

November has a work period of 4.29 weeks, while October has 4.43 weeks.

Pig iron and ferroalloy production in November was 95,107 tons, or 73.1 per cent of capacity, comparing with 92,115 tons, or 68.5 per cent in October. Cumulative steel output for the January-November period of the past year was 1,234,765 tons, against 1,077,381 tons in the comparable interval of 1938. Pig iron production in the same periods was 662,000 tons and 651,000 tons respectively.

Two Companies Merge

TORONTO—Merger is announced of Standard Sanitary Mfg. Co., Ltd., and Dominion Boiler & Radiator, Ltd., and their products in future will be produced and sold under the trade name and trade mark of Standard Sanitary & Dominion Radiator, Ltd. Officers of the company are: Henry M. Reed, chairman; George C. Crawford, president; J. D. MacDonald, vice-president heating division; Theodore Tafel, Jr., vice-president, plumbing division; Thomas B. Cooper, secretary-treasurer; H. B. Jenney, sales manager, heating division.

Industrial Expansion

NATIONAL STEEL CAR CORP., LTD., Kenilworth Avenue North, Hamilton, Ont., has awarded steel contract to Hamilton Bridge Co., Ltd., and also placed other sub-contracts in connection with new forge plant to be one story, 133 by 263 ft.

Union Drawn Steel Co., Ltd., 2 Weber Street, Hamilton, Ont., has awarded additional sub-contracts in connection with one story, 64 by 165 ft., addition. Pigott Construction Co., Ltd., has general contract.

Algoma Steel Corp., Sault Ste. Marie, Ont., has placed additional contracts for \$200,000 addition to tin plate and sheet mill and construction work has started.

National Harbors Boards is considering plans for construction of shipyards at Three Rivers, Que. W. F. Riddell, Ottawa, is executive secretary.

By-law submitted to ratepayers of Toronto, Ont., in connection with construction of part of sewage disposal works to cost \$5,600,000 was approved at the election Jan. 1. The outlay will

be in excess of \$10,000,000. Plans will be prepared and work started without delay. Ralph Day, Mayor.

Glidden Co., Ltd., 370 Wallace Avenue, Toronto, Ont., has awarded reinforcing steel contract to Bains & David, Ltd., Commissioner Street; structural steel contract to Jno. T. Hepburn, Ltd., 18 Van Horne Street, and general contract to John G. Kent & Son, Ltd., Bay Street, all of Toronto, for \$60,000 plant addition.

John Bertram & Sons, Ltd., 15 Flatt Ave., Dundas, Ont., has awarded general contract to Pigott Construction Co., Ltd., 36 James Street South, Hamilton, Ont., for one story, structural steel and brick, plant addition.

B. F. Goodrich Rubber Co., Ltd., 521 King Street West, Kitchener, Ont., has awarded contract to Dunker Construction Co., Ltd., 251 King Street West, and steel contract to Hamilton Bridge Co., Ltd., Hamilton, Ont., for \$85,000 plant addition.

Taylor Electric Co., 526 Adelaide Street, London, Ont., has awarded number of sub-contracts in connection with \$40,000 plant addition. Roy Hayman, 848 Dufferin Avenue, has general contract.

Sub-contracts have been awarded in connection with one story, 50 by 200 ft., plant addition at Merriton, Ont., for Hayes Steel Products, Ltd. Newman Brothers, 127 St. Paul Street, St. Catharines, Ont. have general contract.

Cariboo Gold Quartz Mining Co., Ltd., 602 Bower Bldg., Vancouver, B. C., will spend \$100,000 on addition to milling plant at the gold property at Wells, B. C., to increase capacity by 100 or 200 tons per day. Dr. W. B. Burnett, is president.

C-I Suspends Laughlin, Shenango Tin Plate Mills

PITTSBURGH—As indicated in THE IRON AGE market reports recently, operations at hot tin plate mills at Carnegie-Illinois Steel Corp.'s Laughlin works, Martins Ferry, and at their Shenango works, New Castle, Pa., have been suspended recently. Finishing mill operations will continue for the next few weeks, until accumulations have been cleaned up.

This move was expected in view of the recent drop in the volume of incoming tin plate specifications. When these higher cost units were started up last October, it was indicated that their duration of activity would depend entirely on the volume of new business. All equipment at these two plants, however, will be maintained in good condition.

... GREAT BRITAIN ...

... Larger export sales being made despite heavy war requirements.

LONDON, Jan. 9 (By Cable)—British steel output is still forging ahead and a new high record is likely this year. Northeast Coast output last year was estimated at over 3,000,000 tons.

Despite the continued large requirements of the Government, increased tonnage is being released for export.

Supplies of semi-finished steel are still insufficient, but much larger arrivals are due from overseas during this quarter.

Scrap demand is still insistent with cast iron in especially short supply.

There is a strong demand for tin plate, especially for nearby shipment to Balkan countries, but works are heavily sold. There is much dissatisfaction in the delay in the announcement of home trade maximum prices on tin plate bars and tin plate for delivery in January and onward as sales are made subject to price ruling at the time of delivery and thousands of boxes are now ready for shipment.

The Continent reports increasing steel activity with domestic demand absorbing the bulk of output, especially Belgian national defense.

Export sales are handicapped by supply shortage. Export prices are nominal.

More Capital for Italian Steel Industry

THE Societa Finanziaria Siderurgica, Rome, in which the Italian state holds an interest through its participation in the Industrial Reconstruction Institute, has decided to double its capital to 1,800,000,000 lire. This will make it the most highly capitalized enterprise in Italy. The object is to finance heavy industries.

Berlin Admits "Retirement" Of Fritz Thyssen

LONDON—It is understood that Berlin now officially confirms the rumor, hitherto denied, that Fritz Thyssen, the famous Ruhr steel magnate, has severed his official connection with the German State. Herr Thyssen has been living in Switzerland for some time, but has not transferred much of his property from Germany.

When the Nazi regime came to

power Herr Thyssen was appointed a Prussian state councillor and a member of the General Economic Council. His fortune is stated to amount to 200,000,000 marks, or about \$50,000,000 at par.

Wisconsin Foundrymen Plan Annual Conference

AVARIED program, covering practically every phase of the production of gray iron, steel, malleable and non-ferrous castings, has been planned for the third annual regional conference sponsored by the Wisconsin Chapter of the American Foundrymen's Association and the department of mining and metallurgy of the University of Wisconsin. The conference will be held at the Hotel Schroeder, Milwaukee, on Feb. 15 and 16.

Among the subjects scheduled for discussion are copper in cast iron, selection of scrap for malleable melting, second stage graphitization in malleable iron, the use of cereal binders in core and molding sand, heat treated steel castings, deoxidation and deoxidizers in steel casting production, improving finish on aluminum and bronze castings, and magnesium aluminum alloys.

On Feb. 15, Phil S. Hanna, editor, *Chicago Journal of Commerce*, will address a luncheon meeting, and on Feb. 16 Nathaniel Leverone, Automatic Canteen Co. of America, will speak at a dinner meeting on "Understanding."

B. D. Claffey, General Malleable Corp., Waukesha, Wis., and Prof. Edwin R. Shorey, University of Wisconsin, head the committee arranging the conference.

Pittsburgh Traffic Club Dinner to be Held Jan. 26

PITTSBURGH—More than 1800 railroad, steel, and other industrial executives are expected to attend the 39th annual dinner of the Traffic Club of Pittsburgh to be held at the William Penn Hotel, Jan. 26. A nation-wide event, this meeting will bring executives from all points of the United States and Canada.

Guest speaker will be T. L. Parkinson, president, Equitable Assurance Society, New York, while J. L. Perry, president, Carnegie-Illinois Steel Corp., will be toastmaster. Carl W. Sunderbrink, Pittsburgh & Lake Erie Railroad, is chairman of the annual dinner committee.

Missouri Pacific 1940 Tool Budget Approved by Court

ST. LOUIS—The 1940 budget of the Missouri Pacific Railway, as approved by U. S. District Judge Moore, includes \$105,740 for shop machinery and tools and \$66,450 for roadway machinery and tools, in addition to \$18,420 for shop machinery and \$15,950 for roadway machinery and tools for the Gulf Coast Lines, and \$10,150 for roadway machinery and tools for the International - Great Northern, subsidiaries.

The shop machinery items to be purchased by the Missouri Pacific, and the estimated cost, include the following:

<i>St. Louis Terminal Division</i>	
1 400-amp. portable welding machine	\$780
1 Whiting locomotive mover	2,800
<i>Arkansas Division</i>	
1 36-in. crank shaper	1,100
1 Comb-grinder and buffer	500
1 Bolt squaring point and centering machine	5,060
1 500-lb. cap jib crane and hoist	740
1 Motor driven twist drill grinder	760
1 Motor driven metal cutting band saw	1,130
1 Valve chamber boring bar	1,160
2 100-ton air operated jacks	1,200
1 36-in. contour metal cutting machine	2,030
1 1-ton capacity hoist	520
1 24 x 3 in. motor driven double grinder	850
1 36-in. band saw	1,080
1 motor driven twist drill pointer	380
1 24 x 3 in. motor driven grinder	930
4 400-amp. portable welding machines	3,120
1 Hand operated 40-ton hydraulic bushing press	260
2 High pressure 40-ton hydraulic bushing presses	260
<i>Memphis</i>	
1 Motor driven sensitive drill press	\$550
<i>Eastern Division</i>	
1 Motor driven metal cutting machine similar to DeWalt G2	2,030
1 Motor driven grinding machine	15,690
1 Twist drill pointer	380
1 Portable electric spot welding machine	3,600
1 12 x 2 in. motor driven double grinder	320
<i>Central Kansas Division</i>	
1 Motor driven 90-in. driving wheel lathe	\$10,060
<i>Colorado Division</i>	
1 Motor driven 90-in. driving wheel lathe	\$28,500
1 Motor driven centering machine	400
<i>System</i>	
9 400-amp. portable electric welding machines	5,290
3 600-amp. portable welding machines	3,690

Shop machinery and tools for the Gulf Coast lines and the estimated cost follow:

1 Sand blasting machine	\$500
1 No. 5 milling machine	9,140
1 Side frame and bolster annealing furnace	4,000
2 50-ton ball bearing air operated car jacks	780
2 Portable 2-in. capacity pipe threading machines	780
1 Automatic cut-off saw	2,000
1 1½-in. double header bolt cutter	2,850
1 Portable horizontal cylinder boring bar	670
1 Double wheel 20 x 3-in. grinder, motor driven	600
2 Electric hoists, 1500-lb. capacity	600
1 Pressure blower for blacksmith shop annealing furnace	2,521

The 1940 budget of the St. Louis San Francisco Railway, as submitted to the U. S. District Court here for approval, includes \$22,441 for shop machinery, the principal items and the cost, being as follows:

1 Milling machine	\$9,437
6 300-amp. electric welding machines	2,993
1 500-capacity air hoist	625
2 Hollowell piston rod pullers	1,097
1 Portable cylinder boring bar	778

Kearney & Trecker to Build Plant Addition

MILWAUKEE—The Kearney & Trecker Corp., large maker of milling machines, last week broke ground for a 70,000 sq. ft. addition to its plant, the expansion to double the manufacturing space of the company, and to increase total floor space to nearly 300,000 sq. ft. Cost of the building and equipment will approximate \$1,000,000.

This project was motivated, according to company officials, by a large backlog of orders, and the need to increase operating efficiency by modernizing the plant layout. It is understood that the new addition can be paid for in a comparatively short time by the savings that will be realized in increased efficiency. Further, capacity will be much increased and in 1940 the company expects to enlarge greatly its previous best annual output. Production facilities have been reserved for twice the amount of domestic business booked in 1937. The company has more domestic orders on hand than ever before.

Occupation of the new building, which is to measure 200 x 330 ft., with a 70 x 56 ft. el. is scheduled for March 1. Construction was started Dec. 20. The Worden-Allen Co. of Milwaukee will fabricate 350 tons of structural steel for the building, and 25,000 sq. ft. of steel window sash will be required. A great amount of equipment has already been purchased, and installation of all major production machinery is expected during February and March.

New Plant Inquiries Heaviest in Years

CLEVELAND—Arthur G. McKee & Co. has at present a larger volume of active inquiries for plant construction than at any time in the past several years, according to a recent letter to stockholders. "Although any prediction is hazardous, we believe that 1940 holds possibilities for decided business improvement," said R. E. Baker, secretary and treasurer.

All-Welded Steel Factory Constructed in Georgia

NEAR the city of Toccoa, Ga., R. G. LeTourneau, Inc., Peoria, Ill., has constructed a large all-welded steel factory measuring 400 x 400 ft. Walls are of 4 x 8 ft. box panel construction with a 6-in. air space between the inside and outside panels, which are laced together with light steel straps. The panels, themselves, are of 12 gage material, and were pressed at the site by a heavy hydraulic press. The roof also consists of panels, but with an air space of 18 in. Roof supports are the walls and jib-crane columns spaced 46 ft. apart throughout the building, there being no girders, beams or rafters. Since all adjoining panels are welded solidly together inside and out, and since the roof also is welded solid where it contacts the walls and the gusset structure at the tops of the crane columns, the entire building is virtually one piece of steel.

Every part of the floor is served by the 5-ton jib cranes, each of which has a 23-ft. radius. The jib crane columns house electric wiring, oxygen, acetylene and compressed air piping, with outlets for each at the column base. Lift trucks transport material about the plant when out of reach of a jib crane.

The new plant of the LeTourneau Co. of Georgia will manufacture a new machine, known as the Tournapull, which loads, hauls, dumps and spreads earth and other similar materials.

Douglas Books 82 Airliners in Six Months

SANTA MONICA, CAL.—Orders for commercial transport planes from air lines in the United States and foreign nations have broken all records in the last six months of 1939, according to the Douglas Aircraft Co. Between June and December, orders for 82 airliners valued at approximately \$10,000,000 were placed with Douglas.

Republic Buys Lucey Plant

CLEVELAND—The Vance Iron & Steel Co., Chattanooga, Tenn., subsidiary of Republic Steel Corp., has purchased a former Chattanooga plant of the Lucey Mfg. Co. The plant will be used by the Vance Iron & Steel Co., a steel jobbing concern in the Chattanooga territory, for warehouse purposes, replacing its former warehouse facilities.

Electrical Appliance Sales to Increase

SALES of household electrical merchandise in 1940 will climb at least 15 per cent over 1939 figures, Frank R. Kohnstamm, sales manager, merchandising division, Westinghouse Electric & Mfg. Co., predicted at a preview of the company's 1940 lines of ranges and refrigerators in New York last week.

Electric refrigerator sales of 2,065,000, a gain of 15 per cent over 1939, are expected, as well as electric range sales close to 400,000, a gain of 20 per cent. Irons, toasters, grills and other appliances may be expected to keep pace, it was said. Washer sales may be as high as 1,750,000 and it is believed that the trend will be toward purchase of better models.

In commenting on refrigerator sales in 1940, T. J. Newcomb, manager, Westinghouse household refrigeration department, stated: "Many factors indicate that this will be one of the biggest years in the industry. One is the fact that 450,000 new homes will be built in 1940, with every one a potential user of electric refrigeration. USHA activity and extension of rural electrification lines further expand the market. Although there are 14,000,000 electric

refrigerators in use, there still remain 10,000,000 wired homes without an electric refrigerator. In addition, the replacement market is growing."

In respect to electric ranges, Reese Mills, manager, Westinghouse range and water heater department, said: "More than 3,000,000 electric ranges are now in use, which means a saturation of 12 per cent of wired homes. Experience proves that when a saturation of 10 per cent or more is reached on any major electrical appliance, the sales volume mounts rapidly." As to electric water heaters, more than 1,000,000 of which are now in use, Mr. Mills stated: "It is our opinion that the electric water heater business will increase about 30 per cent, and we are making our plans accordingly."

Displayed at the preview were 12 models of electric refrigerators, including a new 8-cu. ft. unit developed to meet the needs of the large rural market. The line of eight electric ranges included a new model designed to reach the low income customer. A feature of the preview was a new line of Mobilair packaged room coolers, in three models, designed to meet the need for easily installed, efficient, air conditioning units for homes and offices at a price within reach of the consumer market.

In rolled form, the alloy has a tensile strength in excess of 75,000 lb. per sq. in., and an elongation and reduction of area of about 15 per cent.

16,000 More Steel Workers Employed in November

MORE than 561,000 employees were at work in the steel industry during November, according to the American Iron and Steel Institute. This compares with 545,000 in October and 450,000 in November, 1938.

Steel payrolls for the month of November totaled \$86,682,000, against \$83,421,000 in October and \$61,054,000 in November a year ago.

Belknap Celebrates Centennial

BELKNAP HARDWARE & MFG. CO., Louisville, Ky., established in 1840, is this year celebrating its 100th anniversary. Charles R. Bortorff has been president of the company since 1930. The oldest employee, Frank Strohm, has been with the company for 60 years. An attractive commemorative booklet entitled, "Belknap Welcomes Another Century" has been published for distribution.

Concern Grows Over President's Power

WASHINGTON—Reflecting increased concern over the war-time powers vested in the President and the proposal advanced by the Navy Department for an extension of this authority to cover peace-time emergencies, a bill was introduced in Congress last week calling for a seven-man House committee to determine the extent of the President's emergency powers.

Sponsored by Representative John McDowell, Republican of Pennsylvania, the measure provides for a committee to be named by the speaker of the house. Its duties would be to study the subject and report its findings to the house before Sept. 1, with recommendations for whatever legislation it found necessary. The committee would have the customary authority to subpoena witnesses, require the submission of evidence, and hold public hearings.

In view of the apparently growing concern over the relationship between the limited emergency which is still in effect and the powers vested in the White House under such an emergency, introduction of the McDowell Bill was considered significant. (See THE IRON AGE for Jan. 4, page 77). Since the recommendation of Secretary of Navy Charles Edison was made public last week, Congressional observers are scrutinizing the annual message of the President with respect to foreign affairs, focusing attention on the possibility of a sharp fight over the Administration's foreign and domestic policies in the light of world conditions.

Under the Edison proposal, emergency powers granted temporarily to the President in 1917 to facilitate procurement of ships and war materials on government orders, would be restored with some modifications. The proposed plan would authorize the President to take over any plant, making such use of it as he considered necessary or expedient, if the owner failed to give preference to government orders or refused to supply goods at prices determined by the President to be reasonable.

Organization of the General Piping Co. with national headquarters at 5050 Joy Road, Detroit, has been announced. G. Howard Bodey is erection superintendent, Henry Mofett is chief engineer and Frank Troop is sales manager. The concern will specialize in power plants and industrial piping projects.

Hastelloy C Now Available In Sheet Form

ROLLED sheets and plates of Hastelloy alloy C, a corrosion-resistant nickel-molybdenum-chromium-iron alloy, can now be furnished by Haynes Stellite Co., a unit of Union Carbide & Carbon Corp., Kokomo, Ind. Until a short time ago, this alloy was commercially available as castings only. Now plates weighing up to 100 lb. each can be made, and the alloy can be produced in practically any commercial thickness.

This alloy effectively withstands strong oxidizing agents such as acid solutions of ferric or cupric salts, and aqueous solutions containing chlorine or hypochlorites. It is one of the few metallic materials that will withstand the corrosive action of wet chlorine—at room temperature, its rate of penetration in water-saturated chlorine vapor is only 0.038 in. per year. Hastelloy alloy C also has good resistance to hydrochloric acid up to 50 deg. C. and to sulphuric acid at temperatures up to 70 deg. C. if the concentration is over 50 per cent, or up to boiling if the concentration is under 50 per cent.

December Pig Iron Output at 89.4% of Capacity

PRODUCTION of coke pig iron in December totaled 3,768,336 gross tons, compared with 3,720,436 tons in November. On a daily basis December production dropped 1.9 per cent from that in November, or from 124,015 tons to 121,559 tons in December. The rate of operation last month dropped slightly to 89.4 per cent of the industry's capacity from 90.9 per cent in November.

For the 12 months, production amounted to 31,533,370 tons, contrasted with 18,782,236 tons for 1938.

There were 191 furnaces in blast on Jan. 1, the same number as on Dec. 1. These were operating at the rate of 122,055 tons daily, compared with 124,085 tons on Dec. 1. Three furnaces were blown in and three taken off blast. The United States Steel Corp. blew out one furnace, and independent producers blew in three furnaces and took two out of operation.

Furnaces blown in included: One Eliza, Jones & Laughlin Steel Corp.; one Madeline, Inland Steel Co., and the Provo, Utah, furnace of Columbia Steel Co.

Among the furnaces blown out were: One Cambria, Bethlehem Steel Co.; one Riverside, Wheeling Steel Corp., out for relining; and one Lorain, National Tube Co., also out for relining.

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese†	
	Pig Iron*		1939	1938
	1939	1938	1939	1938
January	2,175,423	1,429,085	20,805	22,388
February	2,060,187	1,298,268	18,655	20,305
March	2,394,615	1,452,487	16,008	21,194
April	2,056,177	1,376,141	11,518	18,607
May	1,717,516	1,255,024	7,888	13,341
June	2,118,451	1,062,021	16,617	14,546
½ year	12,522,369	7,873,026	91,491	110,281
July	2,356,270	1,201,785	21,213	20,818
August	2,659,813	1,493,995	20,628	6,088
September	2,878,556	1,680,435	21,949	630
October	3,627,590	2,052,284	23,944	3,621
November	3,720,436	2,269,983	30,356	13,156
December	3,768,336	2,210,728	36,298	19,197
Year	31,533,370	18,782,236	245,879	173,791

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Gross Tons			
	1939	1938	1937	1936
January	70,175	46,100	103,597	65,351
February	73,578	46,367	107,115	62,886
March	77,246	46,854	111,596	65,816
April	68,539	45,871	113,055	80,125
May	55,404	40,485	114,104	85,432
June	70,615	35,400	103,584	86,208
½ year	69,184	42,497	108,876	74,331
July	76,009	38,767	112,866	83,686
August	85,800	48,193	116,317	87,475
September	95,952	56,015	113,679	91,010
October	117,019	66,203	93,311	96,512
November	124,015	75,666	66,891	98,246
December	121,559	71,314	48,075	100,485
Year	86,393	51,458	100,305	83,658

Merchant Iron Made, Daily Rate

	Tons			
	1939	1938	1937	1936
January	10,603	10,635	16,106	10,537
February	9,637	8,854	16,514	11,296
March	8,951	8,524	16,457	10,831
April	8,508	8,273	14,517	13,897
May	7,038	6,431	19,483	12,814
June	7,613	5,375	15,870	14,209
July	8,396	5,495	19,609	11,619
August	10,022	6,614	17,331	12,148
September	11,293	11,205	20,065	12,526
October	14,651	10,799	18,950	13,645
November	14,859	13,208	15,662	14,739
December	15,100	9,130	10,964	14,852

Production by Districts and Coke Furnaces in Blast

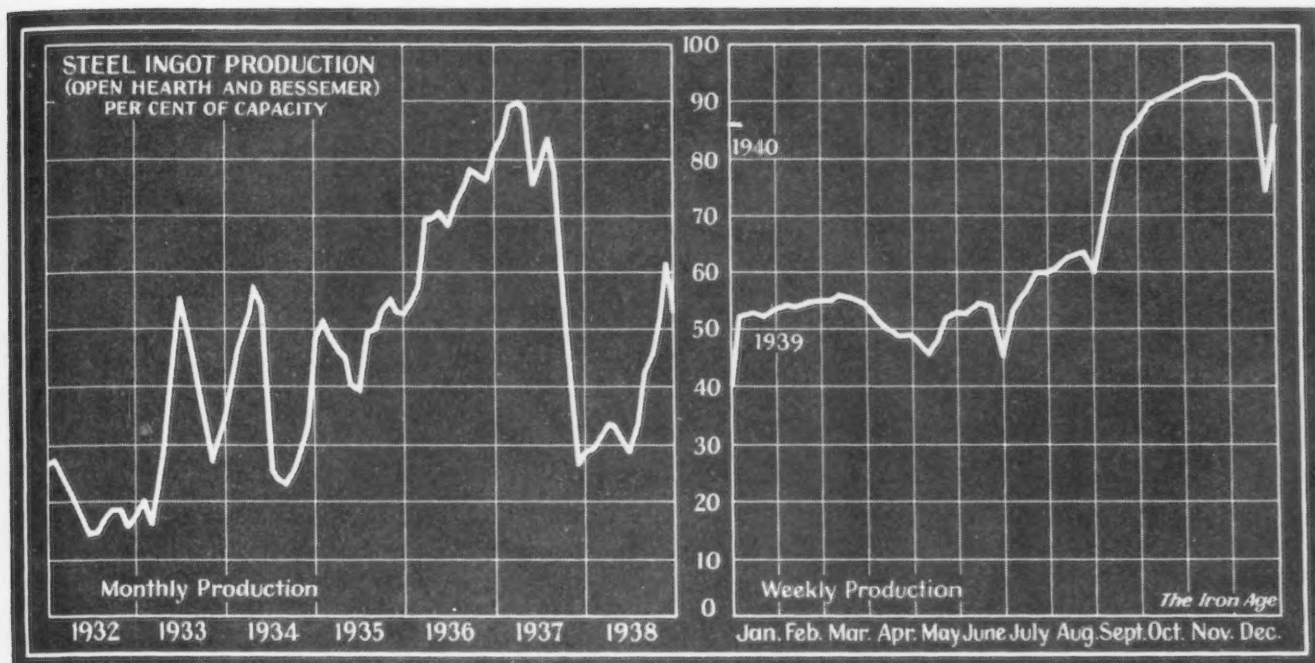
FURNACES	Production (Gross Tons)		January 1		December 1	
	December (31 Days)	November (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	238,704	233,095	11	7,700	11	7,770
Other New York and Mass.	13,902	13,031	1	450	1	435
Pennsylvania:						
Lehigh Valley	81,933	86,130	5	2,645	5	2,870
Spiegeleisen	10,453	9,420	2	335	2	315
Schuylkill Valley	50,932	44,377	3	1,645	3	1,480
Susquehanna and Lebanon Valleys	28,083	25,585	1	905	1	855
Ferromanganese	2,396	918	1	75	1	50
Pittsburgh District	833,024	830,484	39	27,340	39	27,685
Ferro. and Spiegel	13,902	8,828	3	450	2	295
Shenango Valley	71,951	68,627	4	2,320	4	2,290
Western Pennsylvania	93,900	106,042	6	3,030	7	3,535
Ferro. and Spiegel	13,980	13,723	1	450	1	455
Maryland	175,078	179,119	6	5,650	6	5,970
Wheeling District	184,350	174,938	8	5,480	9	6,030
Ohio:						
Mahoning Valley	393,123	377,550	18	12,680	18	12,675
Central and Northern	298,747	307,656	14	9,130	15	10,255
Southern	57,077	60,160	5	1,840	5	2,055
Illinois and Indiana	734,821	720,024	31	24,290	30	24,000
Michigan and Minnesota	133,752	128,475	7	4,315	7	4,285
Colorado, Missouri and Utah	38,405	48,714	4	1,660	3	1,375
The South:						
Virginia .....	.....	.....	0	.....	0	.....
Ferromanganese	3,166	3,100	1	100	1	105
Kentucky	26,722	25,315	2	860	2	845
Alabama	267,081	251,338	17	8,615	17	8,380
Ferro. and Spiegel	2,854	3,787	1	90	1	125
Tennessee .....	.....	.....	0	.....	0	.....
Total	3,768,336	3,720,436	191	122,055	191	124,085

ICC Blocks Cut in Steel Trucking Rate in Ohio

WASHINGTON—Declaring that it would be unreasonably low, the Interstate Commerce Commission has ordered the Sente Trucking Co., to cancel a proposed rate of 12.5c. per 100-lb. minimum 20,000 lb., on manufactured iron and steel from Pittsburgh, Pa., to Dover, Ohio. The trucking company was told it could establish a rate of 16c., which is maintained by a number of motor carriers. The rail rates are 25c., less-than-carload, and 18c., minimum 40,000 lb. Protests against the proposed 12.5c. rate were made by rail carriers and the Central States Motor Freight Bureau, Inc.

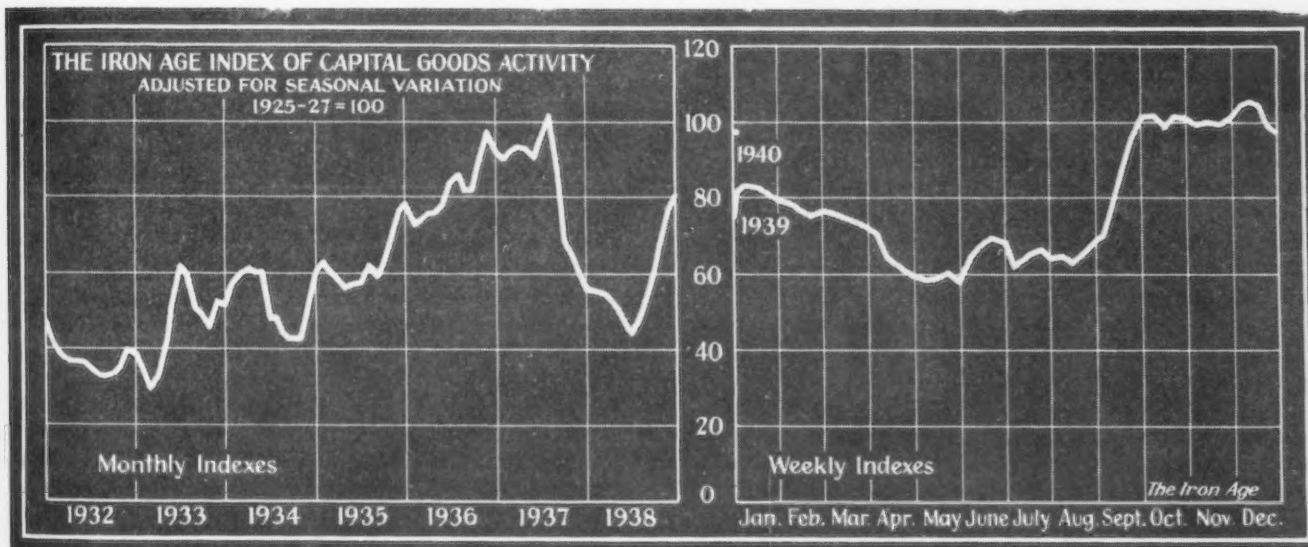
The Sente Trucking Co. claimed that the reduced rate was proposed to enable a Pittsburgh manufacturer to ship sheet steel to Dover in competition with shippers at Cleveland, Youngstown and other Ohio points, which have the benefit of low intra-state rates.

Ingot Rate Holds at 86% of Capacity



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western	St. Louis	Eastern	Aggregate
CURRENT WEEK..	87.0	89.5	78.0	88.0	82.0	68.5	81.0	100.0	94.0	75.5	85.0	74.0	90.0	86.0
PREVIOUS WEEK..	86.0	90.5	83.0	87.0	81.0	68.5	81.0	100.0	94.0	76.0	85.0	74.0	95.0	86.0

Index Begins 1940 15 Points Above First Week of 1939



CURTAILMENT of operations because of the holidays, continues to exert a depressing influence upon THE IRON AGE index of capital goods activity. For the week ended Jan. 6, the index showed a loss of 2.1 points from the preceding week, but despite this loss it was 15.1 points above the opening week of a year ago. Automobile assemblies were held to 87,510 units in the New Year week, 1855 below the Christmas week. Steel output rebounded 124.2 in the past week and a further small gain was indicated in industrial operations and originating shipments in the Pittsburgh districts. Construction contracts were up slightly in the week but the 13-week moving average employed in computing this index recorded a further loss, resulting in the drop to 70.7 in the final index number. The heaviest loss of the week was shown by the lumber carloading index, which lost 16.1

points in the period. Actual carloadings of lumber products for the Christmas week were 19,766 cars, a decrease of 11,945 from the previous week.

	Week Ended Jan. 6	Week Ended Dec. 30	Comparable Week	
			1939	1929
Steel ingot production ¹	124.2	109.3	98.0	121.9
Automobile production ²	116.4	113.3	102.0	111.5
Construction contracts ³	70.7	83.4	94.6	111.5
Forest products carloadings ⁴	56.5	72.6	50.2	127.8
Production and shipments, Pittsburgh District ⁵	118.9	118.2	66.3	121.0
Combined index	97.3	99.4	82.2	118.7

Sources: ¹THE IRON AGE; ²Ward's Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ending Dec. 30. Other indexes cover the week of Jan. 6.

... SUMMARY OF THE WEEK ...

*... Operations unchanged at 86 per cent,
but new buying still lags.*

o o o

*... Pig iron production in December off 1.9
per cent on daily basis.*

o o o

*... Steel backlogs are being reduced though
still substantial.*

BACKLOG tonnage on the books of the steel companies is being reduced as shipments outrun new orders about two to one. However, ingot operations, which remain at 86 per cent for the second week of the new year, probably will not be markedly affected this month at least, and by February a larger volume of new buying is expected, notably from the automobile industry.

Although the aggregate tonnage still on mill books is substantial, certain products, for example plates, structural shapes, tin plate and pipe, can now be obtained for fairly prompt shipment. Bars, sheets, strip and some wire products are more heavily booked, but deliveries of these items are much easier than they were during the fourth quarter.

Consumers of steel have in some instances covered their requirements through all of the first quarter, while others have sufficient tonnage on hand or on order to provide for January and February or only January, indicating that some replenishment buying will be necessary by February in larger volume than that now being done. There is no indication that consumption of steel has fallen off in any important degree as compared with the fourth quarter, but owing to fair-sized stocks and easier mill deliveries steel users are showing less anxiety regarding their future needs.

Indicating the volume of business that steel companies carried over from 1939, one important producer entered the new year with a total backlog equal to about one-fifth of its entire 1939 output. A substantial part of this is railroad business.

WHATEVER improvement in steel buying has occurred since the holidays—and it has been light—consists mainly of small lots to fill in unbalanced stocks. Large orders have been few. The fact that some consumers see pretty good business for some months ahead is indicated by a number of reservations for the second quarter with price at time of shipment to apply.

Some of the recent loss in ingot production is due to lower demand for tin plate. Operations of tin plate mills this week are estimated at 70 per cent, down eight points from last week, and sharply below the rate maintained during most of the fourth quarter.

Resumption of tin plate demand on a larger scale from domestic users is not expected before February, but meanwhile export demand for this product is exceptionally good.

Export demand generally is counted upon to make up some of the losses that may occur in production for domestic purposes. Indicative of the larger export business during the last third of 1939 is the report of November shipments, which totaled 332,899 tons of iron and steel, a gain of 77,818 tons, or 30½ per cent, over October shipments. The largest gain was in South American trade. Great Britain is releasing larger tonnages for export despite the demands of the Government for war purposes.

Renewed buying by the railroads is expected in the near future. About 50,000 freight cars are said to be under consideration. Meanwhile, the new year got a fair start with an order for 50,000 tons of rails from the Pennsylvania, with orders for 15,000 tons of accessories to follow. The Gulf, Mobile & Northern may soon buy 1250 cars and the Norfolk & Western is inquiring for 100. The Delaware & Hudson has ordered 20 locomotives.

The automobile industry is expected to produce about 100,000 cars this week after curtailment due to inventory shutdowns in some plants.

Structural steel business is in seasonally light volume, but sizable awards are pending, including 17,000 tons for a bridge in California and 16,000 tons, mostly piling, for two graving docks in Hawaii.

Mill prices for steel are firm, but overstocks have caused some weakness in warehouse prices. At Detroit heavy products are down \$3 a ton. They were advanced this amount in October, but warehouses in nearby cities did not follow; hence Detroit distributors have had to meet the interstate competitive situation. Galvanized sheets out of stock are weaker in New York and Philadelphia.

PIG iron production in December totaled 3,768,336 gross tons compared with 3,720,436 tons in November, bringing the 1939 total to 31,533,370 tons compared with 18,782,236 tons in 1938. The daily rate last month was 121,559 tons against 124,015 tons in November, a loss of 1.9 per cent. The December operating rate was 89.4 per cent. On Jan. 1 the same number of furnaces was in blast as on Dec. 1, which was 191, but some furnaces will go out this month. Lake Superior iron ore prices have been announced for 1940 without change.

Output of open hearth and Bessemer steel ingots in December was 5,164,420 gross tons compared with the all-time peak output of 5,462,616 tons in November. The year's total was 45,768,899 tons. The December rate of operation was 85.57 per cent and that for the entire year was 64.29 per cent.

THE IRON AGE steel scrap price composite is unchanged this week at \$17.67, moderate weakness at Philadelphia being offset by strengthening at Chicago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Jan. 9, 1940	Jan. 2, 1940	Dec. 12, 1939	Jan. 10, 1939
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chi- cago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Bir- mingham, Sparrows Point	34.00	31.00	34.00	34.00
Sheet bars: Pittsburgh, Chi- cago, Cleveland, Youngs- town, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngs- town, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Bir- mingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Clevel- and, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pitts- burgh, Chicago, Youngs- town, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Spar- rows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pitts- burgh, Chicago, Gary, Buf- falo, Bethlehem, Birming- ham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buf- falo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Cold finished bars: Pitts- burgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	2.10	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pitts- burgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	2.10	2.15
Cold rolled sheets: Pitts- burgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Jan. 9, 1940	Jan. 2, 1940	Dec. 12, 1939	Jan. 10, 1939
Wire nails: Pittsburgh, Chi- cago, Cleveland, Birming- ham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chi- cago, Cleveland, Birming- ham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pitts- burgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	\$5.00

†Applies to 80-rod spools only.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd car- lots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chi-
cago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	\$18.25	\$18.25	\$18.75	\$15.75
Heavy melting steel, Phila.	18.25	18.50	18.75	15.25
Heavy melting steel, Ch'go.	16.50	16.25	16.75	13.75
Carwheels, Chicago	15.75	16.75	16.00	12.50
Carwheels, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Pittsburgh	19.25	19.25	19.25	15.50
No. 1 cast, Philadelphia	20.25	20.25	20.75	16.75
No. 1 cast, Ch'go. (net ton)	14.25	14.25	14.50	12.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	\$4.50	\$4.50	\$5.00	\$3.75
Foundry coke, prompt	5.50	5.50	5.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, Electrolytic, Conn.	12.50	12.50	12.50	11.25
Copper, Lake, New York	12.50	12.50	12.50	11.375
Tin (Straits), New York	48.25	48.75	51.50	46.75
Zinc, East St. Louis	5.75	5.75	6.00	4.50
Zinc, New York	6.14	6.14	6.39	4.89
Lead, St. Louis	5.35	5.35	5.35	4.70
Lead, New York	5.50	5.50	5.50	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

The Iron Age Composite Prices

Finished Steel

Jan. 9, 1940	2.261c. a Lb.
One week ago	2.261
One month ago	2.261
One year ago	2.286

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

High	Low
1939..... 2.286c., Jan. 3	2.236c., May 16
1938..... 2.512c., May 17	2.211c., Oct. 18
1937..... 2.512c., Mar. 9	2.249c., Jan. 4
1936..... 2.249c., Dec. 28	2.016c., Mar. 10
1935..... 2.062c., Oct. 1	2.056c., Jan. 8
1934..... 2.118c., Apr. 24	1.945c., Jan. 2
1933..... 1.953c., Oct. 3	1.792c., May 2
1932..... 1.915c., Sept. 6	1.870c., Mar. 15
1931..... 1.981c., Jan. 13	1.883c., Dec. 29
1930..... 2.192c., Jan. 7	1.962c., Dec. 9
1929..... 2.236c., May 28	2.192c., Oct. 29
1928..... 2.192c., Dec. 11	2.131c., Jan. 3

Pig Iron

\$22.61 a Gross Ton	
22.61	
22.61	
20.61	

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadel-
phia, Buffalo, Valley and South-
ern iron at Cincinnati.

High	Low
\$22.61, Sept. 19	\$20.61, Sept. 12
23.25, June 21	19.61, July 6
23.25, Mar. 9	20.25, Feb. 16
19.73, Nov. 24	18.73, Aug. 11
18.84, Nov. 5	17.83, May 14
17.90, May 1	16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17
18.59, Nov. 27	17.04, July 24

Steel Scrap

\$17.67 a Gross Ton	
17.67	
18.08	
14.92	

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

High	Low
\$22.50, Oct. 3	\$14.08, May 16
15.00, Nov. 22	11.00, June 7
21.92, Mar. 30	12.92, Nov. 10
17.75, Dec. 21	12.67, June 9
13.42, Dec. 10	10.33, Apr. 29
13.00, Mar. 13	9.50, Sept. 25
12.25, Aug. 8	6.75, Jan. 3
8.50, Jan. 12	6.43, July 5
11.33, Jan. 6	8.50, Dec. 29
15.00, Feb. 18	11.25, Dec. 9
17.58, Jan. 29	14.08, Dec. 3
16.50, Dec. 31	13.03, July 9

THIS WEEK'S MARKET NEWS

STEEL OPERATIONS

... Industry rate unchanged from a week ago at 86%

LOSSES in operations in some districts are just about balanced by gains elsewhere, resulting in approximately the same rate of steel operations this week as last, estimated at 86 per cent.

The PITTSBURGH district has gained a point to 87 per cent, but its close rival, the CHICAGO district, is off one point to 89½ per cent. The CLEVELAND-LORAIN and the PHILADELPHIA districts have each gained a point, but the YOUNGSTOWN area has lost five points to 78 per cent. In other districts there are slight variations or none at all from last week.

Some plants are stocking ingots, replenishing the inventories normally carried which were depleted during the rush of the fourth quarter.

NEW BUSINESS

... Tonnage now being booked below that of early December

INCOMING business at PITTSBURGH a week or so ago was sufficient to support about 50 per cent of ingot operations but the trend in the past few days indicates a volume large enough to require 55 to 60 per cent ingot output. Furthermore, steel companies look for a betterment in specifications as soon as customers have finished and analyzed inventory data. Domestic demand is a trifle slow in snapping back from holiday lethargy but there has been a noticeable gain since the first of the year in export demand involving various steel products.

A definite trend in general steel sales will probably be discernible in a week or two but a more or less quiet period is expected to prevail until February, at which time steel producers look for more active buying from both automobile companies and the miscellaneous trade. With steel shipments heavier than incoming releases, backlogs are being pared down further.

While awaiting a trend in new steel business, CLEVELAND and YOUNGSTOWN

steel producers, have found encouragement in the revival of consumer activity from the year-end doldrums. Despite the fact that incoming orders remain well below production, it is expected that continued improvement will within a few weeks bring new business close to the 12-month average for 1939. It is beyond hope, of course, that the peaks of late 1939 will be regained in first quarter.

Largest order backlogs of CLEVELAND and YOUNGSTOWN producers are held in the alloy steel and hot rolled strip divisions. Some of the other departments have made rapid progress into their backlogs since Dec. 15.

A moderate amount of tonnage has been entered for second quarter delivery on the basis of price in effect at time of shipment.

As was predicted by CHICAGO sellers, tonnage now being booked is sharply lower than four and five weeks ago, when the flood of orders was first checked. In view of the tremendous tonnages entered on the books of CHICAGO sales offices, however, this fact is not a cause for alarm, especially since some mills are virtually sold out for first quarter on certain products. One important CHICAGO producer continues to take in new business at the rate of about 75 per cent of capacity. Other mills are probably not entering tonnage in excess of 50 per cent or so of shipments, if that much, but it is generally believed that later this month an upturn in new business will be seen.

Inventory considerations without doubt are responsible for much of the current decline in fresh orders at CHICAGO. That stocks are not excessive, however, is still evident from the continued pressure on mills from buyers for faster deliveries.

The overall picture viewed from CHICAGO is entirely one of optimism. Activity at plants making farm tractors and implements, railroad cars and automobile parts, is practically certain to remain high throughout the quarter. Some of the consumer goods industries may slow down slightly, while distribution equalizes with recent production, but dealers in capital goods around CHICAGO have heavy order books and capacity operations.

New orders in the PHILADELPHIA district, emanating primarily from

plants working on Government projects, are at a rate equal to about 50 per cent of the November buying. One large district seller has estimated that 70 per cent of the consumers in the PHILADELPHIA area are covered through February and at least 40 per cent through January. Deferments throughout the holiday season were surprisingly small and certain industries are still pressing for shipment of material on order. Demand from automobile parts makers and forgers is holding up very well and some fill-in buying of oil country goods was experienced in the past week. Plate demand is very spotty. Plate orders are now being accepted for delivery in an average of two weeks and merchant plates and most sizes of sheets in four to five weeks.

No changes in activity have as yet developed at BUFFALO and business still lags. In spite of this fact the outlook among steel producers remains very good and a brisk demand is looked for in the near future. Small orders are coming in with some regularity. In that district, as elsewhere, business already on the books will keep mills busy for a good part of the first quarter.

Not much new business is expected in St. LOUIS until late in January or early in February, as a result of heavy earlier commitments and a desire to hold down inventories.

Other than the receipt of a good many small orders of the fill-in variety, steel business in NEW YORK has not snapped back to the volume that was being done before the holidays.

Settlement of the San Francisco CIO ship clerks strike reopened the port last week. The end of the dispute made possible resumption of direct shipments of steel to San Francisco. Where delivery date allowed, shipments had been held up pending reopening of the port, but urgent orders were docked at Los Angeles and transhipped to San Francisco by rail.

Construction steel prospects on the West Coast continue extremely bright with private plant expansions backing up heavy military expenditures for coast and mid-Pacific defence. Award is expected momentarily on 16,000 tons of steel by the contractor constructing two graving docks at Pearl Harbor, T. H.

PIG IRON

... Shipments continue at fairly good levels but new buying is light

PIG iron business has not yet taken on any marked first quarter activity. At CHICAGO shipments have declined, owing to inventory considerations, but an improvement is expected late this month. However, foundry coke shipments in that area are holding up, indicating a continuation of the high foundry melt attained in the fourth quarter. Shipments of CLEVELAND and YOUNGSTOWN furnaces have regained some of the ground lost over the holidays, but new business is light and scattered.

Similar conditions prevail in other centers. However, foundry melt is in good volume in nearly all districts, in most instances having recovered from whatever letdown occurred in the holiday period. Foundries are not believed to have burdensome pig iron stocks, in which case continuance of a good melt may bring more market activity within the next few weeks.

The Carnegie-Illinois Steel Corp. has taken a blast furnace out of operation at its Mingo Junction plant for an indefinite period. Another Carnegie stack has been banked at the Farrell works, but will resume operations next week, at which time another furnace will be taken off, making a net loss of one there.

Foreign buyers are showing little interest. Inquiries are light and are mostly for iron of special analyses on which many furnaces are not in a position to quote. The business being taken is going at prices under domestic price levels.

STRUCTURAL STEEL

... Awards only slightly above previous week ... Large jobs on West Coast

FABRICATED steel lettings at 10,625 tons are only slightly higher than a week ago. The largest awards are 2500 tons for the Esperson Building, Houston, Tex.; 1600 tons for a power plant addition for the Consolidated Electric Light & Power Co., Baltimore, and 1400 tons for a Psychiatric Patient's Pavilion in Brooklyn.

New structural steel inquiries dropped to 12,400 tons from 13,655 tons last week. Sizable new jobs reported include 2400 tons for nine State bridges in Oklahoma; 1600 tons for State buildings at Willowbrook,

N. Y.; 1290 tons for eight State bridges in Illinois; 1250 tons at Denver for an Air Corp. hangar and annexes; 1200 tons at Philadelphia for a material assembly shop for the Navy Department, and 1000 tons for cranes at Brooklyn, Philadelphia and Norfolk Navy Yards.

Structural specifications at PITTSBURGH have not yet regained the level existing before the holidays but an improvement has been noted from a week ago. Structural backlogs at PITTSBURGH have been reduced moderately recently as shipments have been moving out at a much higher rate than incoming business.

Award is imminent on 16,000 tons of steel, mostly piling, for two graving docks at Pearl Harbor, T. H. for which Pacific Bridge Co., San Francisco, and Hawaiian Dredging Co., Honolulu, are contractors. Bids will be opened Jan. 16 on the Pit River bridge, Central Valley Project, Cal., involving approximately 17,000 tons of shapes.

REINFORCING BARS

... Awards of 9700 tons include 2600 tons for housing project

AMONG reinforcing steel awards of 9700 tons the only large letting is 2600 tons for the Terrace Village housing projects in PITTSBURGH.

New reinforcing inquiries of 10,300 tons include 3550 tons for the Grand Coulee Dam, Washington; 2500 tons for the Los Angeles River flood control, Los Angeles, and 2000 tons for the Fairhaven housing project at Buffalo.

Concrete bar prices are relatively firm, although it is occasionally noted that rail bar quotations do not exhibit the same strength as new billet bar prices. Purchases of concrete bars for export have increased in the past few weeks.

COLD FINISHED BARS

... Specifications at low level ... Backlogs being reduced

WITH automobile companies having placed orders in December and with miscellaneous demand still influenced by year-end factors, the volume of current specifications continues at a relatively low level. Shipments are going forward promptly and unfilled tonnage backlogs are being rapidly reduced.

WAREHOUSE BUSINESS

... New extras adopted in Philadelphia and New York

A NEW extra card on hot rolled and cold drawn alloy steels has been issued by warehouses in the PHILADELPHIA and NEW YORK districts. The new extras, effective Jan. 2, are designed to compensate for the high costs involved in handling alloy orders under 300 lb. The new extras are as follows: On 1000 lb. and over, base price; 500 to 999 lb., plus 50c per 100 lb., an increase of 25c.; 300 to 499 lb., plus 75c., unchanged from the previous extra; and under 300 lb., plus \$1.25, also unchanged from the previous schedule.

The significant change in the extras, however, is covered by the following paragraph from the announcement: "An order extra of \$1.75 per 100 lb. will be assessed on total orders under 300 lb. in addition to the maximum item extra, making a total extra of \$3 per 100 lb. on orders less than 300 lb."

The new extra schedule also indicates that hot rolled and cold finished items cannot be combined to obtain a quantity discount, nor can carbon steel items be combined with alloy steels.

The heavy mill shipments to warehouses in December have brought repercussions in both the PHILADELPHIA and NEW YORK areas. Leading warehouses in PHILADELPHIA have announced a reduction in galvanized sheet prices, effective Jan. 10, from 4.93c. to 4.75c. (for 10 bundles or over). This move was taken to meet concessions which have been prevalent over the past several weeks. In NEW YORK, no action has yet been taken, but published sheet prices have been shaded as much as \$5 a ton recently on desirable jobs. This weakness is generally credited to efforts of some of the smaller interests to move the heavy shipments received from the mills over the past four weeks.

Current buying in both PHILADELPHIA and NEW YORK is showing a seasonal slackening, but the general feeling is that an upturn in buying will be experienced around the end of January. Occasional export sales are still being made, but in a much lower volume than in November and December.

Effective Jan. 2, DETROIT warehouse prices on soft steel bars, structural shapes, plates and floor plates were revised downward 15c per 100 lb. on the base price. This restores the prices which were in effect prior to Oct. 16 at which time warehouse quotations were

increased by broadening the spread over mill prices. It was believed at the time that this was a move partly in anticipation of higher mill prices which were expected. It is reported that the new prices were found impractical, particularly out-State, where adjacent market cities were able to undersell DETROIT warehouses.

Warehouse sales at PITTSBURGH in December were fairly comparable with November experience and business so far this month has not fallen off to the extent that it has with steel mills. Demand continues fairly diversified and there are numerous cases of rush orders.

CHICAGO steel warehouses enjoyed business in December equally as good as in the two previous months. The first week of January was a little slow, but the entire month is expected to be very near the December total. Product distribution today is wide.

At BOSTON the year starts with warehouses doing a comfortable weekly business despite the fact that average individual orders placed with them are small. Warehouse stocks are well filled out, but not excessive. Prices throughout their lists are firm and unchanged.

MERCHANT BARS

... Backlogs are substantial but new orders are lighter

BAR sales at PITTSBURGH were among the first to snap back after the holidays but the current volume of incoming business is not quite up to the level which existed before Christmas week. Deliveries remain extended on small bar shapes but the overall tension on deliveries has been relieved to some extent. With incoming business below shipments, mills have again dissipated some of their backlogs.

In CHICAGO bars are probably booked far ahead more than any other steel product. One mill is virtually sold out for first quarter, and several other local producers are scheduled well through February or beyond. The farm implement and tractor manufacturers, makers of automotive parts, jobbers, cold drawers and forgers are chiefly responsible for the CHICAGO bar situation.

Bar mills at CLEVELAND and YOUNGSTOWN have made good progress against their order backlogs recently since new business represents less than half of output. Delivery promises on small size merchant bars are still greatly extended, however.

TUBULAR GOODS

... 11,000 tons bought for a pipe line in Kansas

TOTAL tubular goods sales at PITTSBURGH, although still affected by year-end influences, have staged a partial comeback. Total incoming oil-country business is not as heavy as a few months ago but nevertheless reflects improvement in the past two weeks. Standard pipe demand has been easing off some lately. The Stanolind Pipe Line Co., Wichita, Kan., a subsidiary of Standard Oil Co. of Indiana, has purchased about 11,000 tons of 8- and 10-in. pipe for a crude oil line of about 145 miles to run from Ellis County, Kan., to Washington, Kan. National Tube Co., Pittsburgh, will supply the line pipe.

BOLTS, NUTS AND RIVETS

... Sellers look for revival of buying soon

WHILE current purchases are light, sellers at CLEVELAND look for a strong revival in new business before the end of this month. During the pause since Dec. 15, consumption has held up better than expected. South American export demand is reported growing rapidly, due to the fact that apparently users are running short of material.

... PLATES ...

... Prompt deliveries now obtainable from most mills

ALL sellers in the East are now quoting the 2.10c. base on plates, although one eastern Pennsylvania mill is not committing itself beyond Jan. 31 on this basis. New business is running light in the East. Mill backlogs of the smaller independents are being rapidly reduced and deliveries are prompt. One to two weeks is the general quotation on standard items, and some material has been delivered within five days of the receipt of specifications.

Export demand for plates is worldwide, but the principal market continues to be South America. For some time now, tank plates have been sold at a base of 2.45c., with ship plates at 2.55c. or at 2.45c. with full extras. Some shading in these prices is reported, but the tonnages involved have been light.

Chicago mills can offer prompt shipment. Current demand is light, and except for tonnage on order for railroad car builders and a few construction projects, not a great deal is looked for until spring.

Outside of railroad car builders' fill-in requirements, and a moderate amount of boiler work, new business in plates at CLEVELAND is very light. Backlogs have declined to the point where prompt deliveries may be obtained.

SHEETS AND STRIP

... Orders are light and backlogs are declining

ON the whole, sheet specifications at PITTSBURGH are only slightly heavier than a week ago. Because of the inventory taking season, miscellaneous demand remains affected and major support is coming from diversified automotive requirements. With substantial purchases having been made by several motor car makers in December for early 1940 delivery, additional buying from auto centers is not expected before February, at which time a greater interest in cold rolled sheet requirements will probably materialize. The extra charge for coiling cold rolled sheets continues to meet resistance but mills insist the revision will be maintained because it is dictated entirely by actual mill costs.

Orders are light at CLEVELAND but production continues strong, especially on hot strip and sheets. Backlogs held by cold mills and galvanizing departments are smaller now than at any time since August. New automotive orders for cold rolled strip and sheets are expected soon, however.

The delivery situation at CHICAGO is mixed. Whereas one producer is practically sold through March on both hot and cold rolled sheets, some other mills are able to deliver in short order either type of sheet. The variance in capacity of the respective mills is of course a factor. Most sellers today report slow new business, but continued pressure from consumers for shipment of tonnage booked.

Bookings of SOUTHERN OHIO sheet mills during the past week were about equal to the closing week of the past year, new business being figured at approximately 50 per cent of mill capacity. Mill operators believe that a substantial amount of business is in the offing. Improvement in demand toward the end of the month is expected.

New sheet business since the first of the year has been extremely light in the NEW YORK area, but is considered no index of what the month as a whole may bring forth. While no buyer is pressing for delivery of sheets on old orders, there is no tendency to postpone shipments scheduled at the time specifications were received last fall.

REFRACTORIES

... *Chrome brick advanced \$3 a ton*

EFFECTIVE Jan. 1 for shipment in the first quarter, refractory makers have advanced the price of chrome brick \$3 a ton, making standard and chemically bonded chrome brick f.o.b. Baltimore, Plymouth Meeting and Chester \$50 a net ton. Standard magnesite brick, f.o.b. Baltimore and Chester, has been advanced \$5 a net ton to \$72, while chemically bonded magnesite brick, f.o.b. Baltimore, has been advanced \$4 a net ton to \$61. Imported grain magnesite, because of war conditions, is now unavailable. No changes were made in fire clay or silica brick or in domestic grain magnesite.

SHIPBUILDING

... *Two passenger liners for Pacific routes may be built*

IT is understood that the Maritime Commission will shortly take bids on two new passenger liners which will be used on Pacific routes. Steel requirements of these two boats will probably be in excess of 12,000 tons each.

WIRE PRODUCTS

... *Changes in size extras on merchants wire announced*

TOTAL wire sales at PITTSBURGH, especially those involving wire rods and manufacturers' wire, are in as good, if not better, volume than a month ago. While domestic demand has sagged slightly due to year-end factors, a pickup in export business has been noted. Export prices con-

tinue at a level moderately higher than domestic published quotations. Merchant wire business is at an exceptionally low ebb.

Because of the recent changes in processing extras made on manufacturers' wire, including revision in annealing extras as reported in THE IRON AGE last week, changes in size extras on annealed fence wire or merchant quality wire have been announced. 15 gage merchant quality annealed wire takes an extra of 55c. per 100 lb. against 60c. as heretofore, 16 gage is 75c. compared with 80c. previously, 17 gage is \$1 as against \$1.10 previously, and 18 gage is now \$1.50 instead of \$1.60. These extras are applicable to the annealed fence wire base of 3.05c. a lb. f.o.b. Pittsburgh, Cleveland, and Birmingham.

The first quarter has started off at CLEVELAND with production well maintained at wire mills and with new business likely to pick up before the end of the month. Some consumers are still taking inventory. While manufacturers' wire has been in the spotlight since the advent of cold weather in the north, demand for merchant products will be revived over the next few weeks in anticipation of the usual spring peak.

SEMI-FINISHED STEEL

... *Backlogs being reduced, specifications lower*

IN the past two weeks, shipments at PITTSBURGH have been somewhat ahead of incoming business, with the result that backlogs have been moderately reduced. Specifications are off from a week ago. A clarification in trend is expected as soon as consumers complete and analyze inventory taking routines.

IRON ORE

... *Prices for 1940 delivery unchanged from 1939*

LAKE SUPERIOR iron ore price schedules for delivery during the 1940 season will be unchanged from the 1939 quotations, according to announcement of a leading seller late on Jan. 2. Inquiries and orders established the price this year earlier than for any season since World War days. Schedules were not announced last year until May 4. The price of old range bessemer 51.50 per cent natural iron for delivery at lower lake ports is \$5.25 per gross ton. Old range non-bessemer \$5.10, Mesabi bessemer \$5.10, Mesabi non-bessemer \$4.95.

TIN PLATE

... *Operations lower at 70% . . . Export demand gains*

TIN plate operations this week are estimated at 70 per cent, down 8 points from a week ago. Total specifications in the past week were about on a par with a week ago but a better volume of export business has materialized since the first of the year. Whether this is indicative of further increases from foreign sources remains to be seen. Mill stocks continue relatively heavy and with shipments at a higher level than fresh orders, backlogs are being reduced slightly.

Dubois-Webb Co., 2832 E. Grand Boulevard, Detroit, has been announced as the Michigan representative of Pennsylvania Pump & Compressor Co., Easton, Pa. The Dubois-Webb Co. will act as sales, service and sales engineers in that territory. The company will continue to represent the American Well Works and the Bingham Co., Simplex Valve and Meter Co., Fisher Governor Co., Haveg Corp., McNulty Engineering Co., Victaulic Co. and B. O. Bushnell Co.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Jan. 9, 1940	Jan. 2, 1940	Dec. 12, 1939	Jan. 10, 1939	1940	1939
Fabricated structural steel awards	10,625	9,000	16,600	19,600	19,625	55,700
Fabricated plate awards	420	3,910	7,505	6,900	4,330	7,375
Steel sheet piling awards	0	100	0	215	100	215
Reinforcing bar awards	9,700	6,350	1,245	10,250	16,050	11,650
Total Letting of Construction Steel..	20,745	19,360	25,350	36,955	40,105	74,940

REINFORCING STEEL

... Awards of 9700 tons; 10,300 tons in new projects.

ATLANTIC STATES AWARDS

- 2600 Tons, Pittsburgh, Terrace Village housing project, to Truscon Steel Co., Youngstown, through Hunkin-Conkey Co., contractor.
- 700 Tons, Fall River, Mass., Sunset Hill housing project, to Joseph T. Ryerson & Son, Inc., Chicago, through M. Spinelli & Sons.
- 600 Tons, Atlantic City, N. J., Jonathon Pitney housing project, to Sweets Steel Co., Williamsport, Pa., through John McShain Co., Philadelphia, contractor.
- 390 Tons, Somerset County, Pa., Allegheny Mountain tunnel ventilation building, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa., through Ritter Bros., contractors.
- 120 Tons, Bayonne, N. J., Electric Boat Co. plant, to Fautoute Iron & Steel Co., Newark, through Austin Co., contractor.
- 100 Tons, New York, sanitation dump and ramps, to Bethlehem Steel Co., Bethlehem, Pa., through P. T. Cox Construction Co., contractors.

CENTRAL STATES

- 3000 Tons, Toledo, filtration plant, to Hausman Co., Toledo, through Jerome Utley Co., Detroit.
- 190 Tons, Chicago, State highway bridge and paving work, to Ceco Steel Products Co., Chicago.
- 120 Tons, Medina and Summit Counties, Ohio, State project No. 246, to Pollak Steel Co., Cincinnati, through A. J. Baltes.
- 112 Tons, Rantoul, Ill., Air Corps hangar and school, to Bethlehem Steel Co., Bethlehem, Pa., through T. S. Willis, Janesville, Wis.

WESTERN STATES

- 300 Tons, Oakland, Cal., Campbell Village housing project, to Gilmore Fabricators, Inc., San Francisco, through K. E. Parker, San Francisco, contractor.
- 268 Tons, Issaquah, Wash., bridges on State highway No. 2, to Bethlehem Steel Co., Seattle, through Rumsey & Co., Seattle, contractors.
- 227 Tons, Odair, Wash., Grand Coulee Dam (Bureau of Reclamation Invitation B-38075-A), to Sheffield Steel Co., Kansas City, Mo.
- 227 Tons, Odair, Wash., Grand Coulee Dam (Bureau of Reclamation Invitation B-38076-A), to Bethlehem Steel Co., San Francisco.
- 207 Tons, Alameda, Cal., seaplane ramp at Navy base, to Gilmore Fabricators, Inc., San Francisco, through Clyde W. Wood, Los Angeles, contractor. Tonnage includes 67 tons of mesh.
- 135 Tons, Shasta County, Cal., Bass Hill viaduct, to Gilmore Fabricators, Inc., San Francisco, through Granfield, Farrar & Carlin, contractors.
- 170 Tons, Los Angeles, grade separation at First and Figueroa Streets, to Blue Diamond Corp., Los Angeles, through Grif-fith Co., Los Angeles, contractor.
- 161 Tons, Albany, Cal., buildings at regional agricultural laboratory, to Ceco Steel Products Co., San Francisco, through Moore & Roberts, San Francisco, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 2000 Tons, Buffalo, Fairhaven Housing project; Boehm Bros., contractors.
- 250 Tons, Westmoreland County, Pa., section 5-P-3, Pennsylvania Turnpike Commission; bids Jan. 12.
- 238 Tons, Orange County, N. Y., grade elimination.
- 150 Tons, Hartford, Conn., housing project.

CENTRAL STATES

- 870 Tons, Chicago, Central Avenue viaduct; bids Jan. 17.
- 600 Tons, Ironton, Ohio, flood wall, U. S. Engineers; bids Jan. 31.
- 473 Tons, Winnetka, Ill., grade separation project; bids in.

- 400 Tons, St. Louis and Jefferson Counties, Mo., highway bridge over Meramec River; Massman Construction Co., Kansas City, Mo., low bidder on general contract (previously reported).
- 240 Tons, Cincinnati, for city; bids Jan. 16.
- 200 Tons, Ypsilanti, Mich., boys' dormitory.

WESTERN STATES

- 3550 Tons, Odair, Wash., Grand Coulee Dam (Bureau of Reclamation Invitation B-38088-A); bids in.
- 2500 Tons, Los Angeles, flood control on Los Angeles River; bids Feb. 8.
- 472 Tons, Scotia, Cal., Eel River bridge; bids Jan. 24.
- 221 Tons, Denver, railroad underpass; bids Jan. 13.

HAWAII

- 475 Tons, Wheeler Field, T. H., 600-man barracks; bids Jan. 16.

Court Reverses NLRB on SWOC Contract for Inland

CHICAGO—In a unanimous decision Tuesday the United States Circuit Court of Appeals, speaking through Judge J. Earl Major, reversed a finding of the National Labor Relations Board which had ordered the Inland Steel Co. to sign a written contract with the Amalgamated Association of Iron, Steel and Tin Workers, a CIO affiliate.

The case was remanded to the NLRB for hearing as the court agreed with the Inland company that the company had not had a fair hearing because of the attitude of Examiner Charles A. Wood. In its decision, the court said that the Inland case "illustrates the danger of placing in a single agency the multiple duties of prosecutor, judge and executioner."

November Steel Exports Advance 30.5%

WASHINGTON—Rising 77,818 gross tons, a gain of 30.5 per cent, exports of iron and steel last November totaled 332,899 tons compared with 255,081 tons in October, the largest increases being made in shipments to non-belligerent countries. Scrap exports in November declined 64,119 tons to 272,656 tons from 336,775 tons in October. Of the November scrap movement Japan took 180,538 tons and the United Kingdom 30,960 tons. During the 11 months ended last November exports of scrap aggregated 3,371,025 tons compared with 2,675,196 tons exported during the corresponding period of 1938.

Steel exports in November reflected increases in all world markets, except for Africa. The largest gain was in the trade with South America where shipments rose to 68,745 tons from 39,936 tons in October. The next to

largest gains were made in the Far East which took 72,680 tons in November, a gain of 23,073 tons over October. Finland, alone taking only 769 tons, was the only belligerent nation which took more steel in November than in October.

The largest movement was 46,587 tons of tin plate, a large portion of which went to Canada, the leading market for November exports. Shipments to Canada were 66,140 tons. The United Kingdom ranked second, taking 31,452 tons, a decline of 15,000 tons under October. Exports to Sweden amounted to 26,876 tons in November, an increase of 15,000 tons over October.

Steel exports during the January-November period of 1939 totaled 2,104,967 tons compared with 1,982,845 tons exported in the corresponding period of 1938.

PERSONALS

DAVID W. THOMAS has been appointed manager of sales, tin mill products, Jones & Laughlin Steel Corp., Pittsburgh, succeeding Philip Schaefer, who has been made special representative, with duties to be assigned. Mr. Thomas started with American Sheet & Tin Plate Co., Pittsburgh, in 1913, later being transferred to Wheeling, W. Va. In 1917 he joined the operating department of Bethlehem Steel Co. at Sparrows Point, Md. After war service, he returned to Bethlehem Steel Co. At Bethlehem, Pa., in 1919 Mr. Thomas advanced through various positions in operating, order, schedule, and sales departments of that organization with most of his activities being centered in the sheet and tin plate sales departments.

♦ ♦ ♦

HENRY J. McADAMS has become associated with the sales staff of Jones & Laughlin Steel Corp., New York district office, to specialize in the sale of oil country tubular goods. Mr. McAdams was New York manager of Tokheim Oil Tank & Pump Co. since 1934.

Wickwire Spencer Steel Modernizes Eastern Mills

IN conjunction with the completion of its new million-dollar fine wire mill at Buffalo, Wickwire Spencer Steel Co. announces the completed enlargement and extensive modernization of production facilities at its Palmer mill, Palmer, Mass., and its Morgan mill at Worcester, Mass.

Bryant Sees Factory Building Upturn in 1940

CLEVELAND—With leaders in almost every field responding to generally improved business by a careful re-examination of the efficiency in their own plants, conditions today would indicate an increase of 20 per cent or more in the total volume of factory building during the coming year, according to George A. Bryant, Jr., vice-president, The Austin Co., Cleveland.

Long delayed re-adjustments are being pressed, he said, and if the work required to eliminate bottlenecks, non-productive handling operations and other uneconomic factors in the operation and maintenance of many plants is carried forward, this alone would take care of the increase.

"The fact is that if available new machinery and today's advanced production methods were to be applied generally in modern plants, the cost of many manufactured articles could be cut materially, and in some cases enough to permit a one-third reduction in the selling price and still leave the manufacturer a good profit," he continued.

"The effect which progress of this sort would have in expanding markets for basic commodities, as well as for manufactured goods, can be anticipated by anyone who knows what low cost production of photographic film, light bulbs and electrical appliances, automobiles and printed matter has done to extend the use of chemicals, power, steel, petroleum and paper. Most of the industrial building that was launched last year was based on developments in industries like these, and they should prove the largest factor in this field again in 1940."

Another Bill Licensing Scrap Exports Offered in Congress

WASHINGTON—Another bill providing for licensing of iron and steel scrap exports was placed in the Congressional hopper last week and referred to the Senate Military Affairs Committee. Described by its sponsor, Senator Francis T. Maloney, Democrat of Connecticut, as a bill to protect the domestic iron and steel industry of the United States in the interest of the national defense, the measure is patterned closely after the tin plate scrap licensing bill which became law in February, 1936, and seeks to vest the licensing authority in the President.

"Sloppy Sam" Used as a Lesson in Plant Cleanliness



THE quaint character pictured here has proven a painless, effective solution to one of industry's paramount operating problems—that of promoting safety and efficiency through plant cleanliness.

"Sloppy Sam" is the unkempt gentlemen's name, and he's a brain-child of the plant inspection committee in the Buffalo plant of Joseph T. Ryerson & Son, Inc. Sam is given lodging in departments proclaimed sub-standard by the committee during their weekly inspection tours. His visits evoke good-natured chiding from members of other departments who in turn make a definite effort to keep their departments clean so the unwelcome visitor will have no reason to call on them. The results of this humorous approach to the cleanliness problem were so favorable that duplicates of Sam were made for the company's other plants. The figures are flame-cut by Ryerson from rolled steel plate and are painted.

As cleanliness is a definite contribution to safety and efficiency in any industry, Ryerson's successful sugar-coated approach to this problem can undoubtedly be used to advantage by operating departments in almost every factory or plant.

Republic Union Urges NLRB Be "Disestablished"

CLEVELAND—The central council of independent unions of Republic Steel Corp.'s northern plants at the end of a two-day session in Cleveland last week announced a resolution urging "drastic revision of the National Labor Relations Act."

The resolution asked that the present labor board be "disestablished," and that another board be created with five members "who will interpret the policies of the Congress and of all the people of this democracy, without the ever present partisanship and bias characteristic of the present board."

It also was suggested that provision be made to protect "the constitutional right of employees to organize as they desire, whether as independents or any other form of organization." A copy of the resolution was sent to Congressman Howard W. Smith, of Virginia. The central council also met with management representatives on the question of 1940 vacations, but no decision was reached.

Chester Crosby, Youngstown, was re-elected treasurer of the council; Harold Dyer, Warren, vice-chairman. Edward L. O'Connell, Buffalo, was re-elected chairman and Harry E. Grimm, Cleveland, was named secretary.

Fire Causes \$100,000 Loss To Tool Plant in Ohio

CLEVELAND—An all-night fire Jan. 4 damaged the McPherson-Huff Tool Co. plant at Sabina, Ohio, with loss estimated at around \$100,000.

Fire here Jan. 5 damaged the Z. & W. Machine Co. shop on St. Clair Avenue, N. E., but was prevented from reaching several thousand dollars' worth of airplane parts being manufactured indirectly for the Government.

Michigan Scrap Men Elect

DETROIT—The Michigan chapter of the Institute of Scrap Iron and Steel has elected the following officers: Milton K. Mahler, Morrow Steel Co., president; Gordon D. Skinner, Luria Bros. & Co., vice-president; H. W. Smith, Samuel G. Keywell Co., Inc., secretary; Morris Birnbaum, Morris Birnbaum & Co. (Wyandotte), treasurer. Directors are B. L. Keywell, F. G. Keywell, Harry Goldman, Riverside Scrap Iron & Metal Co., J. Levinson, Central Scrap Iron & Metal Co.; J. Lenick, E. Lenick & Co., Saginaw, Mich., and E. Elk, Castle Brothers, Inc., Flint, Mich.

FABRICATED STEEL

NORTH ATLANTIC STATES AWARDS

- 1600 Tons, Baltimore, power plant additions for Consolidated Electric Light & Power Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 1400 Tons, Brooklyn, Psychiatric Patient's Pavilion, to Lehigh Structural Steel Co., Allentown, Pa.
- 700 Tons, Massena, N. Y., shipping and warehouse building for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa.
- 470 Tons, Long Island City, N. Y., addition for Ford Instrument Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 350 Tons, Erie County, N. Y., bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 300 Tons, New York, Midtown Highway, Midtown Tunnel Plaza, to American Bridge Co., Pittsburgh.
- 260 Tons, Arnold, Pa., building extension for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa.
- 255 Tons, Washington, fuse loading plant, to Dietrich Brothers, Baltimore.
- 225 Tons, Indian Orchard, Mass., building extension for Chapman Valve Mfg. Co., to Haarman Steel Co., Holyoke, Mass.
- 200 Tons, Germania, N. J., grade crossing elimination, to Bethlehem Steel Co., Bethlehem, Pa.
- 155 Tons, Orange, Mass., Millers River State bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 155 Tons, Dunmore, Pa., State Procurement Office, Dunmore High School grandstand, to Pine Brook Iron Works, Scranton, Pa.
- 140 Tons, Wadsworth - Jamaica, Vt., State bridges, to American Bridge Co., Pittsburgh, William E. Dailey, North Bennington, Vt., contractor.
- 135 Tons, Dunfalk, Md., American Zirconium Co., plant addition, to Dietrich Brothers, Baltimore.
- 120 Tons, Washington, extension to building No. 177 for Navy Department to Barber & Ross, Washington.

THE SOUTH

- 2500 Tons, Houston, Tex., Esperson Building, to Mosher Steel Co., Dallas, Tex.
- 120 Tons, Bosque County, Tex., bridge, to Central Texas Iron Works, Waco, Tex.

CENTRAL STATES

- 592 Tons, Chicago, movable traffic barriers, to Archer Iron Works, Chicago.
- 260 Tons, Cincinnati, building for Cincinnati Chemical Co., to Bethlehem Steel Co., Bethlehem, Pa., through J. & S. Harig Co., Cincinnati, general contractor.
- 175 Tons, Channahon, Ill., two State bridges, route 7, section FFXF, to Bethlehem Steel Co., Bethlehem, Pa.
- 160 Tons, Chicago, State bridge, route 4-A, section 46-SF-2, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

- 150 Tons, Glendale, Cal., steam plant, to Pennsylvania Iron & Steel Co., Los Angeles.
- 100 Tons, Oakland, Cal., Coca Cola bottling plant, to Moore Drydock Co., Oakland, Cal.
- 100 Tons, Alaska, Alaska air base radio towers, to Pacific Car & Foundry Co., Seattle.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 1600 Tons, Willowbrook, N. Y., State buildings Nos. 60 and 61.
- 1200 Tons, Philadelphia, materials assembly shop for Navy Department.
- 1000 Tons, Brooklyn, Philadelphia, and Norfolk, Va., cranes, for Navy Department.
- 230 Tons, Augusta, Me., building addition for Kennebec Pulp & Paper Co.
- 170 Tons, Philadelphia, Midvale Co. hammer shop extension.
- 110 Tons, Deferiet, N. Y., mill building for St. Regis Paper Co.

SOUTHWEST

- 2400 Tons, State of Oklahoma, nine highway bridges; bids Feb. 6.

CENTRAL STATES

- 3800 Tons, Chicago, Central Avenue viaduct; bids Jan. 17. Reported last week as 2500 tons.
- 1290 Tons, State of Illinois; eight bridges; bids Jan. 19.
- 1500 Tons, St. Louis and Jefferson Counties,

Mo., highway bridge over Meramac River; Massman Construction Co., Kansas City. Mo., low bidder on general contract (previously reported).

- 900 Tons, Winnetka, Ill., state grade separations; bids in.
- 220 Tons, Cleveland, East Ninth Street underpass; bids Jan. 11.
- 200 Tons, Steubenville, Ohio, office building for Ohio Bell Telephone Co.; Guy Johnson, Steubenville, general contractor.
- 150 Tons, Quarry, Iowa, bridge No. 448 for Chicago & North Western Railroad.
- 140 Tons, Montour, Iowa, bridge No. 415 for Chicago & North Western Railroad.

WESTERN STATES

- 1250 Tons, Denver, Air Corps hangar No. 2 and annexes.
- 475 Tons, Bonneville, Ore., intake gates; bids Jan. 23.
- 440 Tons, Denver, railroad underpass; bids Jan. 13.
- 295 Tons, Bonneville, Ore., switch structure.

... PIPE LINES ...

Sinclair-Prairie Oil Co., Gulf Building. Houston, Tex., has authorized immediate construction of 6-in. welded steel pipe line from Long Lake, Tex., oil field district to connection with main trunk line from east Texas area, about 10 miles, for crude oil transmission. Company will take over a steel pipe line system in Long Lake field, about 30 miles long, and will make improvements and extensions, including about four miles of new gathering steel pipe lines. A pumping station will be built in oil field noted. Cost close to \$600,000.

Metropolitan Water District. 306 West Third Street, Los Angeles, will ask bids soon for steel pipe line extensions in water supply system from Colorado River, following east line of Los Angeles County through Brea Canyon from La Verne to Fullerton, Cal., and thence to Anaheim and Santa Ana, for water distribution to these municipalities. Cost over \$200,000. Later further extensions are planned in pipe line system for water supply at Santa Monica, Glendale, Burbank and Beverly Hills, Cal.

Hastings, Neb., is considering steel pipe line system for municipal natural gas distribution, and proposes to purchase present system of Central Power Co., whose franchise expires next fall; extensions and replacements will be made. A conditional contract for natural gas supply is being made with E. W. Dahlgren, Oklahoma City, Okla., and new welded steel pipe line will be built from gas field to city for main gas transmission, including control station at terminus in municipality, booster station and other operating facilities. Cost about \$385,000, of which approximately \$200,000 will be represented by bond issue; special election to approve latter fund will be called soon. F. E. Devlin, Hastings, is consulting engineer.

Louisville Gas & Electric Co., Louisville, is arranging fund of \$125,000 for extensions and improvements in gas system this year, including additions and replacements in pipe lines, station equipment and facilities, etc.

Standard Oil Co. of California, Inc., 225 Bush Street, San Francisco, plans new welded steel pipe line from Coalinga-Amerada gas field to new natural gasoline plant to be erected at Coalinga, Cal., for natural gas transmission. Line will have capacity of about 20,000,000 cu. ft. per day. A booster station will be built.

Burbank, Cal., has rescinded contract for 24-in. steel pipe recently awarded to Consolidated Steel Corp., Los Angeles, at \$55,900 and will make purchase in open market.

Belmont Quadrangle Co., Bradford, Pa., F. M. Brewster, president, plans steel pipe lines for natural gas transmission in connection with gas well development in Oriskany gas field area, near Andover, N. Y. A num-

FABRICATED PLATES

AWARDS

- 250 Tons, Anaconda, Mont., roof for flue, Anaconda Copper Mining Co., to Worden-Allen Co., Milwaukee.
- 170 Tons, Port Arthur, Tex., oil barge, to Gulf States Shipbuilding Co.

NEW PROJECTS

- 1500 Tons, Sunnyvale, Cal., wind tunnel at Moffett Field; bids Jan. 10.
- 950 Tons, Dayton, Ohio, test chamber and wind tunnel for Government.

SHEET PILING

AWARDS

- Unstated Tonnage, Cleveland, bulkheads for Cuyahoga River improvement, to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Dredge & Dock Co., Cleveland.

NEW PROJECT

- 1050 Tons, Los Angeles, Los Angeles River flood control; bids Feb. 8.
- 500 Tons, Cleveland, cut No. 9-A, Cuyahoga River straightening; bids about Jan. 25.

ber of new wells will be drilled. Entire project will cost over \$125,000.

Stanolind Pipe Line Co. will build a 145 mile line from Ellis County, Kan., to its Wyoming trunk line at Washington, Kan.

CAST IRON PIPE

Wheatridge Water District. Wheatridge, Colo., Arthur J. Apel, chairman, plans water pipe line system, including main trunk line. Cost about \$74,000. Special election is planned in February to approve bonds in that amount.

Waverly, Mo., plans pipe lines for water system and other waterworks installation. Bond issue of \$100,000 is being arranged for this and sewer system. Harrington & Cortelyou, Dwight Building, Kansas City, Mo., are consulting engineers.

Seguin, Tex., plans water pipe line system and other waterworks installation. Fund of about \$145,000 is being arranged for this and extensions and improvements in sewer system.

Agra, Kan., will take bids in about 60 days for pipe lines for water system; also for elevated steel tank and tower, and other waterworks installation. Paulette & Wilson, 1006 Kansas Avenue, Topeka, Kan., are consulting engineers.

Thibodaux, La., asks bids until Jan. 23 for about 13 miles of 12, 14 and 16-in. pipe for new raw water supply line from point on Mississippi River to municipality, with alternate bids on each of three sizes noted, and alternate bids on cast iron, steel and asbestos-cement pipe (Section 1); furnishing miscellaneous pipe line materials and laying pipe line noted (Section 2); for elevated steel tank and tower, with alternate bids on storage capacities of 150,000, 200,000 and 250,000-gal. for tank (Section 3). J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Bishop, Cal., plans pipe lines for water system and other waterworks installation. Special election has been called Jan. 23 to approve bond issue of \$75,000 for project.

Whittier, Cal., has arranged fund of \$25,000, partially through Federal aid, for pipe line extensions in water system and new pumping station work to begin at once. M. R. Bowen is city engineer.

Lawton, Okla., plans pipe line extensions in water system and other waterworks installation. Cost about \$60,000. W. B. Hendricks is engineer.

El Centro, Cal., has awarded 250 tons of pipe to U. S. Pipe & Foundry Co., San Francisco.

Hawthorne, Cal., has taken bids on 250 tons of pipe.

Wheeler Field, T. H., roads and utilities on which Hawaiian Construction Co., Honolulu, is low bidder, require approximately 150 tons of pipe.

... NON-FERROUS ...

... Buyers show little interest in making new commitments, but consumption is maintained at a high level . . . Zinc stocks up slightly in December . . . Heavy February tonnages of lead yet to be covered.

NEW YORK, Jan. 9—The market in the past week was a very dull affair as buyers continued to sit back and await developments before making new commitments. The present quietude, however, does not reflect any slackening in fabricating activities, for according to all available data, the non-ferrous fabricating industry has sufficient orders on hand to keep it fully occupied through the first quarter. Daily copper sales in the past week were well below the 1000-ton mark, and total sales for the month to

date are about half that of the comparable period of December.

Domestic quotations remain unchanged at 12.50c. per lb., Connecticut Valley. Both the English and French buying commissions were reported last week to have issued fairly substantial inquiries for copper and brass products. Thus far, outside of the acquisition of a relatively minor tonnage of rods by the French, these proposals are still pending. A few small foreign sales were made during the week at 12.50c. per lb., f.a.s.

Lead

Sales of lead are holding up better than any of the other non-ferrous metals, but are still far below the volume of two months ago. Chief interest in the past week centered on January positions. At present that month is close to 90 per cent covered, while February has barely been touched. While buyers in general are not covering forward as far as was the practice in the past quarter. Domestic prices appear very firm at 5.50c. per lb., New York.

Zinc

Another large seller recognized the 6.14c., New York, basis last week, leaving only a few, smaller interests still adhering to the 6.39c. level. Prime Western sales for the week, 2698 tons, showed no important change from the preceding week. Shipments during the period were 3000 tons. After declining for five consecutive months from a high of 135,241 tons in June, slab zinc stocks rose 4473 tons in December to 65,995 tons. Shipments in the month were 53,368 tons as against 64,407 in November. Production was 57,941 tons in December and 53,524 tons in November.

Tin

Trading was very light all the past week and prices were depressed by the large volume of recent arrivals and prospects of continued ample supplies for some time to come. Barring some unforeseen development in the international picture, quotations are likely to work still lower. A £4 gain in cash standards in the London market this morning boosted prompt Straits here ½c., but no explanation for the sudden rise is yet available here.

December Average Prices

The average prices of the major non-ferrous metals in December, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley.	12.50c.
Lake copper, Eastern delivery...	12.50c.
Straits tin, spot, New York.....	50.86c.
Zinc, East St. Louis.....	6.02c.
Zinc, New York.....	6.41c.
Lead, St. Louis.....	5.35c.
Lead, New York.....	5.50c.

Brainard Steel Refunding

WARREN, Ohio—Brainard Steel Corp., manufacturer of electro-galvanized strip steel, cold rolled strip, barrel hoops and box strappings, has filed a registration statement covering the issue of \$375,000 of 5½ per cent first mortgage convertible bonds and \$37,000 of \$1 par value common stock, to be used for refunding bonds now outstanding and for modernization and replacement of plant equipment. Capacity will not be greatly enlarged, however, according to E. T. Sproull, president of the company.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Jan. 3	Jan. 4	Jan. 5	Jan. 6	Jan. 8	Jan. 9
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	48.00	47.50	47.50	....	47.75	48.25
Zinc, East St. Louis ²	5.75	5.75	5.75	5.75	5.75	5.75
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	49.75c.	52.00c.
Copper, Lake	13.75c.	13.625c.
Copper, electro	14.00c.	13.625c.
Copper, castings	13.625c.	13.375c.
*Copper sheets, hot-rolled	21.12c.	21.12c.
*Yellow brass sheets ...	19.31c.	19.31c.
*Seamless brass tubes..	22.06c.	22.06c.
*Seamless copper tubes.	21.62c.	21.62c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.10c.	8.00c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.00c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ¼	30.62c.	29.75c.
Babbitt metal, anti-friction grade	27.50c.	20.75c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.25c.	10.875c.
Copper, hvy. and wire..	9.25c.	9.625c.
Copper, light and bottoms	8.25c.	8.75c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	8.50c.	9.125c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or comp. turnings	8.125c.	8.625c.
Lead, heavy	4.50c.	4.875c.
Cast aluminum	9.00c.	10.00c.
Sheet aluminum	14.25c.	15.25c.
Zinc	3.125c.	4.375c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$157 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.00c. a lb.

IRON AND STEEL SCRAP

... Mixed trends in markets, with composite price remaining at \$17.67 for third week.

JAN. 9—Opposite trends in two markets and a static condition in a third has resulted in the composite price of No. 1 heavy melting steel remaining at \$17.67 for the third week. The last mill sale and broker coverages warrant the quotation of a flat price of \$16.50 at Chicago, boosting the average 25c., while at Philadelphia small sales to mills in that district have effected a decline of 25c. in the average price of No. 1 there. Representative sales at Pittsburgh have confirmed last week's quotations on No. 1 and railroad heavy melting. Elsewhere, prices are either static or softer. Railroad sales have forced down Youngstown prices 50c., and some items on the Cleveland list are lower, although open-hearth grades generally are not affected. Sentimentally, the Detroit market is weaker, but prices are unchanged. All over the country severe winter conditions continue to slow up yard activity. Shipments by rail are not hampered, however, and there are few places where any restrictions are in effect as to receipt of scrap.

Export prices are softer where ocean bottoms are lacking and along the Southern seaboard a reversal of the flow of material, inland to Birmingham, is not unlikely. New York brokers expect more boats this month, however, and their arrival in increasing numbers will tend to stiffen the market.

Pittsburgh

The market is a little more clarified than a week ago and slightly heavier representative sales of No. 1 heavy melting steel have been made into consumption between the range of \$18 to \$18.50. No. 1 steel remains quotable at this range, unchanged from a week ago. Sales of railroad heavy melting have also clarified the railroad heavy melting quotation of \$19 to \$19.50, sales having been made into consumption within this range during the past week. Heavy melting steel on the B. & O. list in the past week went to a broker at less than \$19 a ton while the Pennsylvania Railroad heavy melting was sold to a broker at slightly over \$19 a ton.

Chicago

Sentimentally this market is stronger, though no mill has bought No. 1 steel for more than last week's price of \$16.50. Brokers who formerly were paying no more than \$16.25, are now offering \$16.50 at the least and in some cases \$16.75. A 3-in. snowfall has ham-

pered gathering and shipping of scrap to a moderate extent.

Philadelphia

After two weeks of unchanged quotations, the downward trend has been resumed here, although each new decline is meeting with noticeably greater resistance. On the basis of sales averaging around 500 tons each, reductions of from 25c. to 50c. have been made in several items. No. 1 steel was bought at \$18 during the week and No. 2 at \$17. There were offerings of No. 2 steel by brokers at slightly under \$17, but no mill has as yet acted on these offerings. A small lot of stove plate was bought at \$15, unchanged from the previous sale.

Youngstown

A decline of 50c. a ton on the No. 1 heavy melting steel quotation this week narrows the spread normally maintained between Cleveland and Youngstown prices. The change is occasioned by the recent railroad sales. Mills are accepting scrap deliveries on a reduced basis at Warren and Youngstown while in two other cities the movement had practically stopped at the start of this week.

Cleveland

The market was quiet at the start of this week with shipments resumed on a regulated basis following the curtailment over the holidays. Steel of the principal local railroad list is understood to have commanded around \$18 per ton, off \$1 from a month ago for shipment downstate. A small tonnage brought a slightly higher price. Open-hearth grades for the most part are unchanged this week, but a few minor revisions elsewhere in the list are necessary. Cast grades appear to be holding up pretty well.

Buffalo

The week passed over a quiet market still awaiting its first activity of the new year. Values remained unchanged, with No. 1 heavy melting steel nominally quoted at \$17 to \$17.50. Restrictions at the only mill which had them in force have now been lifted and shipments are moving freely. A bid below the prevailing range is being maintained by a leading consumer.

St. Louis

Hit by cold weather and heavy snows, the scrap iron trade is at a standstill. Prices are unchanged. No shipments are being received from the country, and the yards are idle. The market is dull, and there are no indications of buying by the mills. Mills are fairly well supplied with material but dealers yard stocks are low. Railroad lists: Missouri Pacific, 1300 tons; Gulf Coast Lines, 1400 tons; Chicago & Eastern Illinois, 450 tons.

Cincinnati

Although there have been no old material sales of importance, the general tone of the market is firmer in anticipation of increased mill interest during the quarter. While dealers tend to be more bullish, bids in this area are still unchanged, primarily because the trade was more conservative in its reduction of quotations than was true in other areas. Mills are still taking some material on continuing commitments, but heavy tonnages have not been reported.

Birmingham

The scrap volume being moved does not show any greater activity than the average of the past several weeks. Local prices are unchanged and may remain as they are for the next week or two, it is believed. Inland shipments to Birmingham have picked up some and word received here is that coast dealers are trying to effect some sales in this and other sections due to the inability of coastal dealers to secure bottoms for shipments.

Detroit

Continued lack of activity on any important scale had a somewhat depressing effect on sentiment in the Detroit scrap market during the last week. Dealers who had been holding onto scrap have evidenced some change in sentiment and are reported to be selling scrap more readily to brokers. Local mill interest in scrap is said to be at a low point, although the principal consumer bought light tonnages during December.

New York

Cold weather has slowed up yard operations during one of the most extended periods of below-normal temperatures that New York has experienced in some time, and prior to this prevailing price levels had not been drawing out much scrap. With an expected increase in the number of vessels loading in the New York harbor this month, a stiffening of prices would normally be expected, but lately brokers have keyed their offering prices with the trend of THE IRON AGE composite price of No. 1 steel, which has been downward.

Boston

Export prices on steel and stove plate are noticeably lower because vessel space is lacking and exporters have all material needed for the first boats that may arrive. When they will arrive is problematical. For domestic shipment, bundled skeleton has advanced about 50c. to 60c. a ton, while blast furnace material has been cut 25c. and eastern Pennsylvania steel turnings consumers with \$7.15 contracts filled now offer \$7 a ton on cars.

Toronto

Dealers in Toronto and Montreal have reduced buying prices 50c. a ton on heavy melting steel, low phos. steel and drop forge flashings and lowered scrap pipe 25c. a ton. Cast borings and steel turnings, however, developed strength and were marked up 25c. per ton to \$6 and \$6.50 per ton, respectively, delivered Toronto yards. Other materials held unchanged.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
Railroad heavy melting	19.00 to 19.50
No. 2 heavy melting	16.75 to 17.25
Railroad scrap rails	20.00 to 20.50
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.00 to 18.50
Hand bundled sheets	17.00 to 17.50
Heavy steel axle turn.	16.50 to 17.00
Machine shop turnings	12.50 to 13.00
Short shov. turnings	14.00 to 14.50
Mixed bor. & turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Cast iron carwheels	19.50 to 20.00
Heavy breakable cast.	15.50 to 16.00
No. 1 cupola cast	19.00 to 19.50
RR. knuckles & coup.	22.25 to 22.75
Rail coil springs	22.75 to 23.25
Rail leaf springs	22.75 to 23.25
Rolled steel wheels	22.75 to 23.25
Low phos. billet crops	24.00 to 24.50
Low phos. punchings	21.50 to 22.00
Low phos. heavy plate	21.00 to 21.50
Railroad malleable	20.50 to 21.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	17.00
Hydraulic bund., new.	18.00 to 18.50
Hydraulic bund., old.	14.50 to 15.00
Steel rails for rolling	22.50 to 23.00
Cast iron carwheels	20.00 to 20.50
Hvy. breakable cast.	18.00 to 18.50
No. 1 cast	20.00 to 20.50
Stove plate (steel wks.)	15.00
Railroad malleable	22.00
Machine shop turn.	12.00 to 12.50
No. 1 blast furnace	11.50
Cast borings	11.50 to 12.00
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	21.50 to 22.00
Couplers & knuckles	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Steel axles	23.00 to 23.50
Shafting	23.00 to 23.50
Spec. iron & steel pipe	18.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	16.50
Auto. hvy. mltng. steel alloy free	\$15.00 to 15.50
No. 2 auto steel	12.00 to 12.50
Shoveling steel	16.50
Factory bundles	15.25 to 15.75
Dealers' bundles	13.75 to 14.25
No. 1 busheling	14.75 to 15.25
No. 2 busheling, old	6.00 to 6.50
Rolled carwheels	19.00 to 19.50
Railroad tires, cut	19.25 to 19.75
Railroad leaf springs	18.50 to 19.00
Steel coup. & knuckles	18.50 to 19.00
Axle turnings	15.00 to 15.50
Coil springs	19.50 to 20.00
Axle turn. (elec.)	17.00 to 17.50
Low phos. punchings	19.50 to 20.00
Low phos. plates 12 in. and under	19.00 to 19.50
Cast iron borings	8.50 to 9.00
Short shov. turn.	10.00 to 10.50
Machine shop turn.	8.50 to 9.00
Rerolling rails	19.00 to 19.50
Steel rails under 3 ft.	19.00 to 19.50
Steel rails under 2 ft.	19.50 to 20.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	15.25 to 15.75
Railroad malleable	18.50 to 19.00
Agric. malleable	14.50 to 15.00
Per Net Ton	
Iron car axles	21.75 to 22.25
Steel car axles	20.00 to 20.50
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast.	13.75 to 14.25
Clean auto. cast	14.00 to 14.50
No. 1 railroad cast.	13.25 to 13.75
No. 1 agric. cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Grate bars	10.00 to 10.50
Brake shoes	11.50 to 12.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	17.00 to 17.50
Low phos. plate	21.00 to 21.50
No. 1 busheling	17.25 to 17.75
Hydraulic bundles	17.50 to 18.00
Machine shop turn.	11.50 to 12.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$17.50 to \$18.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Comp. sheet steel	17.00 to 17.50
Light bund. stampings	14.00 to 14.50
Drop forge flashings	16.00 to 16.50
Machine shop turn.	10.50 to 11.00
Short shov. turn.	11.50 to 12.00
No. 1 busheling	16.25 to 16.75
Steel axle turnings	15.50 to 16.00
Low phos. billet and bloom crops	23.50 to 24.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
No. 2 busheling	11.50 to 12.00
No. 1 cupola cast	19.50 to 20.00
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	22.00 to 22.50
Rails for rolling	21.00 to 21.50
Railroad malleable	21.00 to 21.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Scrap rails	17.50 to 18.00
New hvy. b'ndled sheets	15.50 to 16.00
Old hydraul. bundles	14.50 to 15.00
Drop forge flashings	15.00 to 15.50
No. 1 busheling	15.00 to 15.50
Machine shop turn.	10.00 to 10.50
Shov. turnings	13.50 to 14.00
Mixed bor. & turn.	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Knuckles & couplers	22.00 to 23.00
Coil & leaf springs	22.00 to 23.00
Rolled steel wheels	22.00 to 23.00
No. 1 machinery cast.	18.00 to 18.50
No. 1 cupola cast	17.00 to 17.50
Stove plate	15.00 to 15.50
Steel rails under 3 ft.	22.50 to 23.00
Cast iron carwheels	18.00 to 18.50
Railroad malleable	19.50 to 20.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$15.50 to \$16.00
No. 1 hvy. melting	14.50 to 15.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	16.50 to 17.00
Misc. stand sec. rails	16.00 to 16.50
Railroad springs	17.00 to 17.50
Bundled sheets	10.00 to 10.50
No. 1 busheling	13.75 to 14.25
Cast bor. & turn.	5.50 to 6.00
Machine shop turn.	7.00 to 7.50
Heavy turnings	10.50 to 11.00
Rails for rolling	18.00 to 18.50
Steel car axles	19.50 to 20.00
No. 1 RR. wrought	11.00 to 11.50
No. 2 RR. wrought	14.50 to 15.00
Steel rails under 3 ft.	19.00 to 19.50
Steel angle bars	16.00 to 16.50
Cast iron carwheels	18.00 to 18.50
No. 1 machinery cast.	17.00 to 17.50
Railroad malleable	16.00 to 16.50
No. 1 railroad cast.	16.00 to 16.50
Stove plate	11.00 to 11.50
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails for mltng.	18.00 to 18.50
Loose sheet clippings	9.50 to 10.00
Hydrau. b'ndled sheets	13.50 to 14.00
Cast iron borings	5.00 to 5.50
Machine shop turn.	6.00 to 6.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	4.00 to 4.50
Rails for rolling	19.50 to 20.00
No. 1 locomotive tires	15.50 to 16.00
Short rails	21.00 to 21.50
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast.	17.50 to 18.00
No. 1 railroad cast.	15.50 to 16.00
Burnt cast	9.00 to 9.50
Stove plate	9.00 to 9.50
Agricul. malleable	14.00 to 14.50
Railroad malleable	17.00 to 17.50
Mixed hvy. cast.	15.00 to 15.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$17.00
No. 2 hvy. melting steel	16.00
No. 1 busheling	14.00
Scrap steel rails	16.00
Steel rails under 3 ft.	17.00

Rails for rolling	17.50
Long turnings	6.00
Cast iron borings	8.50
Stove plate	11.00
Steel axles	21.00
No. 1 RR. wrought	15.00
No. 1 cast	16.00
No. 2 cast	12.00
Cast iron carwheels	14.00
Steel car wheels	17.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	\$13.00 to \$13.50
No. 2 hvy. mltng. steel	12.00 to 12.50
Borings and turnings	7.00 to 7.50
Long turnings	6.50 to 7.00
Short shov. turnings	8.50 to 9.00
No. 1 machinery cast.	13.50 to 14.00
Automotive cast	15.00 to 15.50
Hvy. breakable cast.	10.50 to 11.00
Stove plate	9.00 to 9.50
Hydraul. comp. sheets	13.75 to 14.25
New factory bushel.	12.50 to 13.00
Sheet clippings	8.75 to 9.75
Flashings	12.00 to 12.50
Low phos. plate scrap	13.75 to 14.25

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	13.00 to 13.25
Hvy. breakable cast.	14.50
No. 1 machinery cast.	16.00 to 16.50
No. 2 cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings	8.00 to 8.50
Cast borings	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	8.00 to 8.50
Light iron	5.00 to 5.50
Per gross ton, delivered local foundries:	
No. 1 machin. cast.	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$13.00 to \$13.15
Machine shop turn.	6.75 to 7.00
Mixed bor. & turn.	5.75 to 6.00
Bun. skeleton long	10.50 to 10.60
Shafting	18.25 to 18.50
Stove plate	9.65 to 9.75
Cast bor. chemical	9.00 to 9.50
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast.	17.00 to 19.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel.	\$13.00 to \$13.50
No. 2 steel	12.00 to 12.50

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$16.00 to \$17.50
No. 2 hvy. mltng. steel.	15.00 to 16.50

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
Low phos. steel	\$11.50 \$11.00
No. 1 hvy. mltng. steel.	11.00 10.50
No. 2 hvy. mltng. steel.	9.75 9.25
Mixed dealers steel	8.75 8.25
Drop forge flashings	9.75 9.25
New loose clippings	8.75 8.25
Busheling	5.50 5.00
Scrap pipe	7.75 7.25
Steel turnings	6.50 6.00
Cast borings	6.00 5.50
Machinery cast	16.50 16.00
Dealers' cast	15.50 15.00
Stove plate	11.50 11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	\$14.00 to \$15.00
No. 2 hvy. mltng. steel.	12.50 to 13.50
No. 2 cast	12.50 to 13.50
Stove plate	10.50 to 11.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Rails (scrap)	15.50
Stove plate	8.65 to 8.75

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel.	Nominal
No. 2 hvy. mltng. steel.	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.90

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared1.90c.

Wire Rods

(No. 5 to 9/32 in.) Per Lb.
Pittsburgh, Chicago or Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.45c.
Galveston 2.25c.
9/32 in. to 47/64 in. \$3 a net ton higher.
Quantity extras apply.

SOFT STEEL BARS

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)
Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)
Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)
Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.

Philadelphia, del'd 2.15c.
New York, del'd 2.29c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.
Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill
Standard rails, heavier than 60 lb., per gross ton\$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.
Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled
Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.10c.
Detroit, delivered 2.20c.
Philadelphia, delivered 2.27c.
Granite City 2.20c.
On cars dock Pacific ports 2.60c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)
Base per Lb.
Field grade 3.20c.
Armature 3.55c.

Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports 4.50c.
Vitreoous Enameling Stock, 20 Gage*
Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary\$5.00
Standard cokes, Granite City 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box
Granite City\$4.40
Pittsburgh or Gary 4.30

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 sheets)
20x14 in. 20x28 in.
8-lb. coating I.C. \$6.00 \$12.00
15-lb. coating I.C. 7.00 14.00
20-lb. coating I.C. 7.50 15.00
25-lb. coating I.C. 8.00 16.00
30-lb. coating I.C. 8.63 17.25
40-lb. coating I.C. 9.75 19.50

Black Plate, 29 gage and lighter
Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.10c.
Detroit, delivered 2.20c.
On cars dock Pacific ports 2.70c.

Cooperage Stock

Pittsburgh & Chicago 2.20c.
From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.
Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.
Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester
Carbon 0.26-0.50% 2.80c. 3.00c.
Carbon 0.51-0.75 4.30c. 4.50c.
Carbon 0.76-1.00 6.15c. 6.35c.
Carbon 1.01-1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	\$3.05
Galvanized fence wire	3.30
Twisted barless wire	3.40
Woven wire fence, 12½ gage and lighter, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool....	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/8	56 36	1/4 & 5/8	+9 +30
1/4 to 3/8	59 43 1/2	1/2	24 6 1/2
3/8	63 1/2 54	3/4	20 13
1/2	66 1/2 60 1/2	1 & 1 1/4	34 19
3/4	68 1/2 60 1/2	1 1/2	38 21 1/2
1 to 3	68 1/2 60 1/2	2	37 1/2 21

Lap Weld	Lap Weld
2	61
2½	64
3	66
3½	67½
4	68½
4½	69½
5	70½
5½	71½
6	72½
6½	73½
7	74½
7½	75½
8	76½
8½	77½
9	78½
9½	79½
10	80½
10½	81½
11	82½
11½	83½
12	84½
12½	85½
13	86½
13½	87½
14	88½
14½	89½
15	90½
15½	91½
16	92½
16½	93½
17	94½
17½	95½
18	96½
18½	97½
19	98½
19½	99½
20	100½
20½	101½
21	102½
21½	103½
22	104½
22½	105½
23	106½
23½	107½
24	108½
24½	109½
25	110½
25½	111½
26	112½
26½	113½
27	114½
27½	115½
28	116½
28½	117½
29	118½
29½	119½
30	120½
30½	121½
31	122½
31½	123½
32	124½
32½	125½
33	126½
33½	127½
34	128½
34½	129½
35	130½
35½	131½
36	132½
36½	133½
37	134½
37½	135½
38	136½
38½	137½
39	138½
39½	139½
40	140½
40½	141½
41	142½
41½	143½
42	144½
42½	145½
43	146½
43½	147½
44	148½
44½	149½
45	150½
45½	151½
46	152½
46½	153½
47	154½
47½	155½
48	156½
48½	157½
49	158½
49½	159½
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240	540½
240½	541½
241	542½

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati.	23.06
Northern, delivered, Cincinnati.	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ..	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo....\$28.50

Gray Forge

Valley or Pittsburgh furnace..\$22.50

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload).....	\$100.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%.....	\$32.00
Domestic, 26 to 28%.....	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size	
50% (ton lots, packed)	\$82.00*
50% (ton lots in 50 gal. bbl) ..	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots, packed)	142.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio	
Per Gross Ton	
10.00 to 10.50%.....	\$32.50
For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.	
For each unit of manganese over 2%, \$1 per ton additional.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract	
4 to 6% carbon	11.00c.*
2% carbon	17.50c.*
1% carbon	18.50c.*
0.10% carbon	20.50c.*
0.06% carbon	21.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract	
8% carbon	\$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads....	\$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovanadium, contract, per lb. contained V., delivered	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	\$2.25†
Ferrocobaltitanium 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville	\$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are \$5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%....	\$5.25
Old range, non-Bessemer, 51.50% ..	5.10
Messabi, Bessemer, 51.50%.....	5.10
Messabi, non-Bessemer, 51.50% ..	4.95
High phosphorus, 51.50%	4.85

Foreign Ores*

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria	13c.
Iron, low phos., Swedish, average, 68½% iron	13c.
Iron, basic or foundry, Swedish, aver. 65% iron.....	11c.
Iron, basic or foundry, Russian, aver. 65% iron.....	Nominal
Man., Caucasian, washed 52%	50c.
Man., African, Indian, 44-48%	45c.
Man., African, Indian, 49-51%	45c.
Man., Brazilian, 46 to 48%	44c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered..\$23.00 to \$24.00	
Tungsten, domestic, scheelite delivered	23.00 to 25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$18.00
Rhodesian, 45%	22.00
Rhodesian, 48%	25.00
Turkish, 48-49%	29.00
Turkish, 45-46%	24.50
Turkish, 40-41%	22.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	Nominal
48-49%	Nominal

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$22.00
Domestic, f.o.b. Ohio River landing barges	\$22.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines..\$20.00 to 22.00	
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	\$31.00
ditto, in bags, f.o.b., same mines	\$32.60

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J.	4.70c.
No. 6, f.o.b. Bayonne, N. J.	2.74c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	\$4.50 to \$4.75
Foundry, f.o.b. Connellsville, Prompt	5.50 to 6.00
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England....	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland ..	11.05
Foundry, by - product delivered Cincinnati ..	10.50
Foundry, Birmingham..	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.75c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
On reinforcing bars base applies to orders of less than one ton and includes switching and starting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
*Plates, 1/4 in. and heavier	3.76c.
*Structural shapes	3.75c.
*Soft steel bars, round	3.84c.
Iron bars, Swed. char-coal	9.50c.
**Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
*Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.53c.
*Galv. sheets (24 ga.)	5.23c.
Long ternes (24 ga.)	5.90c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretchers leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
*Floor plate, 1/4 in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed	4.85c.
Wire, galv. (No. 9)	4.70c.
O. H. spring steel, flats	4.70c.
Common wire nails, per keg	3.50c.

* For lots 400 to 1999 lb.

**For lots less than 1500 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.85c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Cold-fin. bars (1500 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.05c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.72c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
Black ann'l'd wire, per 100 lb.	\$3.10
No. 9 galv. wire, per 100 lb.	3.50
Com. wire nails, base per keg	2.75
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lbs. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 400 to 1499 lb.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb., plus 50c.; 400 to 1999 lb., base; 2000 to 9999 lb., minus 20c.; 10,000 to 39,999 lb., minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.15c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.70c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	\$60.80
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	3.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.90

* None available.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.55c.
*Structural shapes	3.55c.
*Soft steel bars small shapes, iron bars (except bands)	3.35c.
†Reinforc. steel bars, square and deformed	2.76c.
Cold-finished steel bars	4.16c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	3.35c.
*Spring steel	5.00c.
*Hot-rolled anneal. sheets	3.55c.
†Galvanized sheets (No. 24)	4.75c.
*Diam. pat. floor plates, 1/4 in.	5.25c.

*For quantities between 400 and 1999 lb.

†For 10 bundles or over.

‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	50 & 10 off list
Rivets (structural)	\$4.60 base

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.40c.
Shapes, standard	4.00c.	3.80c.	3.50c.
Soft steel bars	4.00c.	3.95c.	4.00c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.525c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.85c.	4.10c.	3.70c.
Galv. sheets (No. 24 and lighter	5.15c.	5.00c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.00c.	4.75c.
Cold-finished steel			
Rounds	6.80c.	6.60c.	7.00c.
Squares and hexagons	8.05c.	7.85c.	8.25c.
Flats	8.55c.	8.35c.	8.25c.
Common wire nails—base per keg less carload	3.25c.	3.25c.	3.15c.

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.43c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.84c.
Hot rolled strip, under 12 gage	3.68c.
Hot rolled strip, above 12 gage	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.40c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.
*Price applies only in metropolitan Detroit.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Continental Can Co., 100 East Forty-second Street, New York, plans new branch plant at Walla Walla, Wash., where site is now being secured. It will comprise one-story production units, storage and distributing buildings, power house and other structures. Work is scheduled to begin late in spring. Cost close to \$500,000 with equipment.

Southern Kraft Corp., 220 East Forty-second Street, New York, a subsidiary of International Paper Co., same address, has approved plans for expansion and improvements at paper mills at Georgetown, S. C., and Springhill, La., used for container board production. Cost close to \$650,000 with machinery. Work will be placed under way at once.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Jan. 16 for two turret lathes (Circular 352), one hardness testing machine (Circular 351).

Colonial Bottle Cap Co., Inc., 90-10 150th Street, Jamaica, L. I., bottle caps and seals, has leased three-story and basement building, 100 x 225 ft., at York Avenue and Sixty-third Street, New York, for beverage production and mechanical-bottling.

National Biscuit Co., 449 West Fourteenth Street, New York, plans expansion in branch plant on Paine Avenue, Toledo, Ohio, and is negotiating with municipality for closing of that thoroughfare to Maumee River harbor line as site for main one-story unit and auxiliary structures. Cost over \$500,000 with equipment. J. H. Bailey is manager of branch at Toledo.

Mathieson Alkali Works, 60 East Forty-second Street, New York, heavy chemical products, acids, etc., plans expansion in branch plant at Lake Charles, La., comprising new production units and equipment. Cost over \$850,000 with machinery.

Public Buildings Administration, Washington, has let general contract to Albert A. Lutz Co., Inc., 300 Madison Avenue, New York, for new school building at Coast Guard Maritime Service Training Station, Hoffman Island, N. Y., at \$63,950 exclusive of equipment.

Laminated Shim Co., 21-44 Forty-fourth Avenue, Long Island City, brass and other metal shims, babbitt-tipped shims, etc., has let general contract to Vuono Construction Co., 1 Atlantic Street, Stamford, Conn., for one-story plant at Glenbrook, Conn., 100 x 250 ft., with two-story office structure adjoining, 30 x 70 ft. Cost about \$80,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

A. Overholt & Co., Inc., 120 Broadway, New York, distiller, has approved plans for two-story addition to distillery at Broad Ford, near Connellsville, Pa., 65 x 150 ft., for storage and distribution. Cost about \$85,000 with equipment. Sanderson & Porter, 52 William Street, New York, are engineers.

Elastic Stop Nut Corp., 1001 Newark Avenue, Elizabeth, N. J., patented locknuts, etc., has purchased tract, 400 x 750 ft., on Vaux Hall Road, Union, N. J., and will have plans prepared soon for new one-story plant to occupy larger part of site. Cost over \$60,000 with equipment.

John F. Trommer, Inc., 1632 Bushwick Avenue, Brooklyn, brewer, has let general contract to Roth-Buermann Co., 319 Mount Pleasant Avenue, Newark, N. J., for two-story top addition to branch brewery at Orange, N. J. Cost close to \$100,000 with equipment. Robert W. Lyster, 221 North LaSalle Street, Chicago, is architect.

Atlas Steel Barrel Co., 1 West Eighth Street, Bayonne, N. J., has begun work on two-story and basement addition, 60 x 75 ft., and improvements in present plant, for

which general contract recently was let to Austin Co., Cleveland. Cost over \$45,000 with equipment.

Richfield Oil Co., Fifty-eighth Street and Schuylkill Avenue, Philadelphia, plans addition to local oil refinery. Cost reported over \$100,000 with equipment.

Public Works Officer, Building No. 1, Navy Yard, Philadelphia, asks bids until Jan. 17 for superstructure for new assembling shop at yard (Specification 9323).

Standard Pressed Steel Co., Jenkintown, Pa., maker of shop equipment and socket screw products, has commenced erection of 12,000 sq. ft. addition to its main plant.

◀ BUFFALO DISTRICT ▶

Blackstone Mfg. Co., Allen Street, Jamestown, N. Y., washing and ironing machines and parts, has let general contract to Warren Construction Co., Gokey Building, for one-story addition, 80 x 250 ft. Cost close to \$75,000 with equipment.

Allegheny Ludlum Steel Corp., 3445 River Road, Buffalo, has plans for several one-story additions to local mill, on which work is scheduled to begin soon. Cost reported over \$200,000 with equipment. Main offices are in Oliver Building, Pittsburgh.

Century Club Beverage Co., 615 Hawley Avenue, Syracuse, N. Y., plans one-story mechanical-bottling plant, for which bids will be asked soon on general contract. Cost close to \$50,000 with equipment.

◀ NEW ENGLAND ▶

Panther-Panco Rubber Co., Inc., 31 Highland Street, Chelsea, Mass., solid rubber specialties, has let general contract to Canter Construction Co., 6 Beacon Street, Boston, for one-story addition, 110 x 175 ft., with L-extension, 46 x 48 ft. Cost close to \$75,000 with equipment. Isador Richmond, 248 Boylston Street, Boston, is architect.

Thompson & Smith Machine Co., Skowhegan, Me., machinery and parts, plans rebuilding machine shop in three-story building occupied under lease, recently destroyed by fire. Loss over \$40,000 with equipment. Skowhegan Boat & Canoe Co., in same building, also plans rebuilding boat-building works damaged by same fire, with loss about like amount.

Public Works Officer, Building 39, Navy Yard, Boston, asks bids (no closing date stated) for two magazine buildings (Specifications 9611).

First National Stores, Inc., Oakland Avenue, East Hartford, Conn., plans one-story beverage manufacturing and mechanical-bottling plant, 100 x 180 ft. Cost close to \$75,000 with equipment. Ganteaume & McMullen, 99 Chauncy Street, Boston, are engineers.

Shell Union Oil Corp., 50 West Fiftieth Street, New York, plans new bulk oil storage and distributing plant at West Boylston, Mass., including 20 steel storage tanks, pumping station and other facilities.

◀ WASHINGTON DIST. ▶

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Jan. 16 for three circulating pumps, one 1750 gal. per min. capacity, and other two each 600 gal. per min. (Circular 413).

E. I. du Pont de Nemours & Co., Inc., Rayon Division, du Pont Building, Wilmington, Del., plans expansion and improvements in branch mill at Waynesboro, Va., including machinery. A one-story storage and distributing building will be erected. Cost over \$100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, closes bids Jan. 17 for

electric-operated traveling bridge cranes, each 50 ft. long, for New York, Philadelphia and Norfolk Navy yards (Specifications 9547).

Norfolk & Western Railway Co., Norfolk, Va., plans new coal car repair shops with repair yard facilities at local Lamberts Point terminal shops, consisting of one-story buildings for machine shop, blacksmith shop, planing mill and woodworking shop, air brake shop, paint house, store house, oil house and other units; a 150-ton track scale will be installed. A 1100-car capacity coal classification and storage yard will be built on neighboring site, and improvements in present shops made, including motor drives to replace belt-driven equipment. Cost about \$500,000.

◀ SOUTH ATLANTIC ▶

United States Sugar Corp., Cleviston, Fla., has asked bids on general contract for two-story addition, 76 x 145 ft., for general service. Cost over \$50,000 with equipment. L. P. Clarke, Harvey Building, West Palm Beach, Fla., is architect; M. H. Connell, Florida National Bank Building, Miami, Fla., is mechanical engineer.

Commanding Officer, Ordnance Department, Augusta Arsenal, Augusta, Ga., asks bids until Jan. 16 for one precision tool room lathe, milling machine, precision jig borer, geared head screw machine, radial drill and cylindrical grinding machine (Circular 23).

City Council, Kinston, N. C., plans expansion and improvements in municipal power plant and waterworks system, including additional equipment. Bond issue of \$300,000 has been authorized.

◀ SOUTH CENTRAL ▶

Rheem Mfg. Co., Richmond, Cal., steel barrels, drums, hot-water heaters, etc., has let general contract to E. B. Ludwig Construction Co., Inc., 1350 Jefferson Highway, New Orleans, for one-story branch plant, 150 x 300 ft., near Huey P. Long bridge, New Orleans, with several smaller units. Cost close to \$200,000 with equipment. Diboll, Kessels & Associates, Baronne Building, New Orleans, are architects.

Tennessee Enamel Mfg. Co., Forty-second and Elkins Avenues, Nashville, Tenn., enameled steel signs, table tops, stove parts, etc., has let general contract to W. L. Hailey & Co., Cotton States Building, for two-story addition. Cost about \$45,000 with equipment.

Orange Crush Bottling Co., Owenton, Ky., Robert Culley, president, has approved plans for new one-story mechanical-bottling, storage and distributing plant. Cost close to \$45,000 with equipment.

Louisville Gas & Electric Co., Louisville, is arranging fund of about \$2,000,000 for expansion and improvements in power properties, including generating stations, power substations, switching stations, transmission and distributing lines, and other structures.

◀ SOUTHWEST ▶

John Ramming Machine Co., 308 South First Street, St. Louis, machinery and parts, has let general contract to Joseph L. Muren, 3939 Fillmore Street, for new one-story machine shop at 4591 McRee Avenue, 80 x 180 ft. Cost about \$45,000 with equipment.

Bernice Anthracite Coal Co., Russellville, Ark., plans rebuilding tippie at coal mine No. 1, recently destroyed by fire. Loss close to \$40,000 with machinery.

City Council, Winfield, Kan., will take bids soon for auxiliary power plant equipment for municipal electric station, including feed-water heater, piping, etc. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Ben Franklin Refining Co., Ardmore, Okla., plans expansion and improvements in local oil refinery, including new production units; also increase in steel tank storage department and other facilities. Cost close to \$100,000 with machinery.

Duro-Chrome Corp., 1814 McNulty Street, St. Louis, metal products, has let general contract to William H. and Nelson Cunliff Co.,

3320 Lindell Boulevard, for three-story and basement plant addition, 30 x 125 ft. Cost over \$50,000 with equipment. M. F. Marks, Ambassador Building, is engineer.

City Council, San Augustine, Tex., plans call for bids this month for extensions and improvements in municipal power plant, including new 300-kw. diesel engine-generating unit and auxiliary equipment. H. B. Gieb & Co., Mercantile Building, Dallas, Tex., are consulting engineers.

Arkansas Fuel Oil Co., Esperson Building, Houston, Tex., a subsidiary of Cities Service Oil Co., same address, has approved plans for new natural gasoline plant in Waskom gas field, Harrison County, Tex., including compressor station, pumping plant, steel tank storage division and other facilities. Construction will be carried out by company forces. Cost about \$125,000 with equipment.

◀ WESTERN PA. DIST. ▶

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, is arranging appropriation of about \$16,000,000 for next 24 months for expansion and improvements in plants and system. Work will begin soon on an addition to James H. Reed generating station on Brunot's Island, with installation of new 80,000-kw. turbine-generator unit with accessories, high-pressure boilers, switchyard extensions and other structures. Cost over \$7,000,000. An award for generating unit has been made to Westinghouse Electric & Mfg. Co., East Pittsburgh, and contracts for other equipment will be placed soon. Program will include extensions in transmission and distributing lines, power substations, switching stations and other structures. Company also will develop coal-mining properties at Harwick and Warwick, Pa., for power station requirements, and new machinery and mechanical-handling equipment will be installed. A new coal tippie will be built at mine at Warwick. Of gross sum noted over \$500,000 will be used for coal mine developments.

◀ OHIO AND INDIANA ▶

Aeronautical Corp. of America, Inc., Lunken Airport, Cincinnati, has let general contract to F. H. McGraw Co., Middletown, Ohio, for new one-story plant, about 50,000 sq. ft. of floor space, at Middletown Airport, Middletown, for parts production and assembling, with one-story adjoining structure for office and operating service. Cost about \$100,000 with equipment. Garriott & Becker, Times-Star Building, are architects; O. W. Motz, 930 East McMillan Street, is engineer, both Cincinnati.

Cincinnati Chemical Works, Inc., 1743 Cleary Street, Norwood, Cincinnati, industrial chemicals, etc., has let general contract to J. & F. Harig Co., 1425 Queen City Street, for three-story addition, 77 x 150 ft. Cost over \$75,000 with equipment.

Old Fort Mills, Inc., Marion, Ohio, plans rebuilding part of soy bean processing plant recently destroyed by fire. Loss close to \$150,000 with equipment.

Board of Trustees, Miami University, Oxford, Ohio, asks bids until Jan. 15 for extensions and improvements in power house, including two new boiler units and auxiliary equipment. J. P. Schooley, State Office Building, Columbus, Ohio, is State architect.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Jan. 15 for 121 inertia starter, yielding clutch energizer assemblies (Circular 862), one prony brake for testing starter (Circular 853).

Scherer Electric Co., 444 South Pennsylvania Street, Indianapolis, electrical products, has let general contract to E. B. Ball & Son, 1131 North Tacoma Street, for new one-story plant, 110 x 125 ft., at 936 West End Street. Cost close to \$65,000 with equipment. E. C. Doeppers, Raun Building, is architect.

Maumee Malleable Castings Co., Toledo, Ohio, has awarded contract for an addition, 50 x 100 ft., to increase its shipping and warehouse space.

◀ MICHIGAN DISTRICT ▶

Woodlin Steel-Metals Products Co., Marshall, Mich., has leased part of former plant of Simon-Leedle Furnace Co. and will remodel for new works. Present plant will be removed to new location and capacity increased.

Faigle Tool & Die Co., 10226 Woodward Avenue, Detroit, has let general contract to Myles Standish, 49 West Hancock Street, for new one-story plant on Chase Road, Dearborn, Mich., on which superstructure has begun. Cost about \$45,000 with equipment.

United States Engineer Office, Federal Building, Detroit, will take bids early in April for one-story addition to equipment storage and distributing building on Park Place, Sault Ste. Marie, Mich. Cost about \$200,000 exclusive of equipment.

Magnesium Fabricators, Inc., Adrian, Mich., subsidiary of Bohn Aluminum & Brass Corp., Lafayette Building, Detroit, has let general contract to Kriehoff Co., 6661 French Road, Detroit, for two one-story additions for expansion in foundries. Cost over \$65,000 with equipment. C. A. Stuchell and H. W. Buckheit, Lafayette Building, Detroit, are architects.

◀ MIDDLE WEST ▶

American Manganese Steel Co., East Fourteenth Street, Chicago Heights, Ill., has asked bids on general contract for one-story addition for storage and distribution. Cost close to \$40,000 with equipment. Benjamin F. Olson, 19 South LaSalle Street, Chicago, is architect.

Fred H. Levey Co., 4250 West Forty-second Place, Chicago, printing inks and allied products, has let general contract to Poirot Construction Co., 2001 West Pershing Road, for one-story addition, 110 x 133 ft., for storage and distribution. Cost close to \$45,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Purchasing Department, University of Minnesota, Minneapolis, R. S. Callaway, Administration Building, purchasing agent, asked bids until Feb. 15 for power house equipment, including two new steam-generating units, each with capacity of 30,000 lb. per hr., using pulverized coal as fuel; air preheaters, superheaters, forced and induced draft fans, pulverizers, etc. W. F. Holman, Department of Buildings and Grounds, Administration Building, is supervising engineer.

J. & J. Tool & Machine Works, 4344 South Wentworth Avenue, Chicago, has let general contract to James S. Adams, 217 North Mozart Street, for two-story addition, 25 x 102 ft., for storage and distribution. Cost close to \$40,000 with equipment. John A. Stromberg, 140 South Dearborn Street, is engineer.

Board of Water and Light Trustees, Muscatine, Iowa, asks bids until Jan. 15 for coal-handling equipment (Section 10), and feed-water heaters, etc. (Section 11) for municipal power plant. Stanley Engineering Co., Muscatine, is consulting engineer.

Wisconsin Oil Refining Co., Security National Bank Building, Sheboygan, Wis. (temporary office), recently organized, has taken options on about 75-acre tract on Lake Michigan, vicinity of Sheboygan, for new oil refinery. It will comprise one and multi-story units, with steel tank storage division, power house, machine shop and other structures. Cost close to \$750,000 with equipment. D. E. Foster, Room 301, 225 East Michigan Street, Milwaukee, is interested in company.

Rath Packing Co., 1600 Sycamore Street, Waterloo, Iowa, meat packer, has asked bids on general contract for one-story and basement addition, 48 x 158 ft., with extension, 43 x 60 ft. Cost over \$50,000. Henschien, Everds & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Wisconsin Oil Refining Co., Sheboygan, Wis., recently organized, has leased 25-acre tract along Lake Michigan, south of this city, for erection of a \$700,000 plant to refine crude oil from fields in Illinois and Michigan. Dewey Foster, Wauwatosa, Wis., is one of the organizers.

Kimberly-Clark Corp., Neenah, Wis., paper manufacturer, is transferring its coarse wad-

ding processing operations from Niagara Falls, N. Y., to this city. Badger-Globe mill is being renovated and a new two-story building will be erected. Company also contemplates equipping part of its local general offices with air conditioning. This is part of a \$3,500,000 modernization program to be completed this year.

Britt Chemical Co., Milwaukee, has leased with option to buy, a three-story building at 3059 N. Weil Street containing 50,000 sq. ft. of floor space with one-story saw-tooth type extension, with railroad siding.

◀ PACIFIC COAST ▶

Lockheed Aircraft Corp., Burbank, Cal., has asked bids on general contract for one-story assembling building containing about 40,000 sq. ft. of floor space. Cost close to \$100,000 with equipment. Bids will be asked soon for a similar unit, about 28,000 sq. ft. of floor space, to cost over \$60,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects for both structures.

Standard Oil Co. of California, Inc., 225 Bush Street, San Francisco, has approved plans for new natural gasoline plant in natural gas field area near Coalinga, Cal. It will comprise several production units, compressor station, power house, steel tank storage division and other structures. Cost about \$275,000 with equipment.

Albert Products Co., 2262 North Albina Street, Portland, beverages, has acquired a two-story building at Grand Avenue and Salmon Street, 90 x 100 ft., and will remodel for new mechanical-bottling plant. Cost close to \$40,000 with equipment. Smith & Griffiths, Worcester Building, are architects.

Burbank Unified School District, Burbank, Cal., will take bids soon on general contract, closing on or about Feb. 7, for one-story vocational shop, 58 x 144 ft., with mezzanine floor, at Burroughs Junior High School. Cost over \$50,000 with equipment. John C. Austin, Chamber of Commerce Building, Los Angeles, is architect.

Gallaher Machine Shop, Corvallis, Ore., Carl Gallaher, head, has filed plans for one-story machine shop addition, 42 x 50 ft. An overhead crane will be installed.

Paraffine Companies, Inc., 475 Brannan Street, San Francisco, building papers and other heavy paper stocks, tube chip, etc., has asked bids on general contract for one-story addition to main plant at Emeryville, Cal. Cost over \$50,000 with equipment. Leland S. Rosener, 223 Sansome Street, San Francisco, is engineer.

Clark County Supervisors, Las Vegas, Nev., Lloyd S. Payne, clerk, asks bids until Jan. 17 for motor-driven pumping unit and accessories for installation in Searchlight, Nev., water station.

◀ FOREIGN ▶

Commonwealth Air Corp., Fishermen's Bend, Melbourne, Victoria, Australia, airplanes and parts, has purchased about 10-acre tract near Sydney, New South Wales, for new plant. It will comprise one-story units for parts production and assembling of training planes, also a division for aircraft engine manufacture. Cost over \$600,000 with equipment.

Corman Engineering Co., 81 Portland Street, Toronto, Ont., manufacturer of tools, dies, special machinery, etc., has acquired a one-story building at 529 Richmond Street West for expansion, providing about 80 per cent increase in present floor space.

Electronic Industries, Inc., Melbourne, Victoria, Australia, manufacturer of electrical equipment, parts, etc., has approved plans for new one and multi-story plant on two-acre tract of land recently acquired at Grant, MacGowan and Moore Streets, South Melbourne. Erection will be placed under way at once. Cost over \$200,000 with equipment.

Ministry of Finance, Mexico, D. F., plans new cane sugar mill near Mexico City, including storage and distributing buildings, power house, pumping station and other structures. Site is being selected. Cost close to \$300,000 with machinery.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Domestic sales start off quietly ... December volume off considerably from fall months ... Foreign buying still sustained despite recent large commitments ... Nash initiates large tooling program ... Deliveries run six to eight months.

Cincinnati Builders Report Gain in Domestic Demand

CINCINNATI—Machinery demand in the southern Ohio area is still at the same high rate that prevailed during the month of December, with domestic business a trifle better. Export business continues the major factor in the present market, although manufacturers report a slight downward fluctuation during the past week. Profiting from the past year's experience, several local manufacturers are setting up quotas for domestic business. Inquiries were sent to the various sales offices for an estimate of the approximate amount of machines required in the various areas during the coming year and on the basis of the replies, manufacturers have portioned out production schedules during the coming year, so that domestic users may be assured of reasonably prompt delivery. Of course, the delivery situation is still quite a problem with some quotations running up into 1941. On the whole, however, the general average may still be stated at about six to eight months.

Production schedules are still running at factory capacity with some of the busier shops farming out business to less busy shops in this and other districts.

Domestic Market Off to Quiet Start at Cleveland

CLEVELAND—The first week of the new year was quiet in this district because many firms were occupied taking inventory, while others awaited approval of budgets. Negotiations were proceeding on a few special purpose machines, however. The whole local situation was quite normal for early January and the facts did not support any pessimistic conclusions.

The national scene retains considerable strength. The Japanese are buying and the French continue in the market, although on a lessened scale. The British up to the time of this writing have not yet placed many orders. Russia has encountered difficulty in placing new orders. Machine tool producers over the nation would welcome a slight letdown in orders during January and February, which situation appears likely to occur. This would enable them to make a dent in backlogs.

Numerous local plants whose foresight prompted placing of orders in September and October are expecting delivery of new machine tool equipment in the next 60 days. Dealers report that delivery promises have continued to creep backward despite the light tone over the holidays.

Nash Buys Machine Tools For Light Car Production

CHICAGO—At the Nash Motors plant at Kenosha, Wis., plans are well under way for a large program of machine tools for the light car on which Nash plans to start production early this year. A battery of Gleasons already has been purchased, and before this month is ended a considerable portion of the program may be completed.

Over the past few weeks several hundred thousand dollars has been put into new production equipment for an addition to the plant of the Kearney & Trecker Corp., Milwaukee. Exceptional delivery arrangements were made, as occupancy of the new facilities is planned for March 1. The company's manufacturing space will be approximately doubled by the addition, and its 1940 output of milling machines will be much greater than in any other year. Though foreign business undoubtedly is largely responsible for the new building, it is understood that the company has more American business on its books today than ever before. According to officials, capacity will be reserved this year for double the domestic business handled in 1937. Close to \$1,000,000 will be spent on the building plus equipment. Construction is well under way.

December generally was a good month for Chicago machine tool sales agencies. In one office the final month of the year brought in nearly twice as much business as the previous month. Another office reported a rising tide of inquiries and orders in the last half of December as compared with the first half. The general outlook for the first quarter is optimistic.

December Sales Off Sharply in Detroit

DETROIT—Despite renewed activity which has resulted from recent machine tool inquiries in the Detroit area, the average report on machine tool business for December indicates that the month was 15 to 50 per cent below October and November levels. The falling-off in orders and inquiries in the final month of the year remains as a disturbing factor and presents some uncertainties for the months ahead. Whatever the national picture may be, the automotive outlook is for a year of machine tool purchases somewhat below normal. This condition has been brought about, as previously mentioned, largely because of the realization that heavy bookings for machine tools, resulting directly or indirectly from the war, have extended de-

liveries beyond the range where they could possibly be satisfactory for 1941 automobile tooling programs. Even if the delivery situation should be alleviated in the near future, and that seems unlikely, the automobile industry would not now be able to accommodate itself to great changes in next year's model. Of necessity this will affect the business of machine tool men in the automotive area in 1940.

December Shipments Score New High in New York Area

NEW YORK—December, 1939, was the best month of the year as far as shipments and billings of machine tools were concerned, and in the case of some dealers the month's volume represented an all-time record. These shipments reflected the heavy spurt in orders that took place in September immediately following the declaration of war in Europe. Shipments this month are expected to be even heavier. Orders received during December, however, were practically back to normal, being 10 to 25 per cent above the order volume for the summer months, but much below the high rate of activity in September, October and November.

Since the first of the year, the chief selling activity has centered around the aircraft production once more. Some large multiple unit orders are reported, including the placement of an order for 15 radial drills. Radial drills have been a very active sales item in recent months, but most of the sales have gone to only two or three big buyers. Next to aircraft, arsenal buying predominates, with the machine tool industry itself in the New England area a close third in line with current expansion programs because of the large foreign demand. Lengthy deliveries have tended to slow up general industrial buying in recent months and delivery promises are the chief determining factor in the placement of business. June is now the earliest month for delivery of machines on current orders, although occasionally April is cited, as in the case of the radials mentioned above.

Engineering Award Goes to Boston Wire Stitcher Co.

The Boston Wire Stitcher Co., East Greenwich, R. I., manufacturer of Bostitch stapling and stitching machines and Bostitch staples, has received the 1939 Industrial Research Citation for its machine for stitching metals. This citation was given by the Engineering Societies of New England, and recommended by the cooperation committee of that group and the board of judges.

Record Motor Order

PITTSBURGH—Receipt of the largest single order for power station auxiliary equipment awarded during the past two years was announced here by the Westinghouse Electric & Mfg. Co. Contract for 18 auxiliary motors with a combined output of 14,800 hp., costing approximately \$121,000, was awarded by the Public Service Electric & Gas Co., Newark, N. J.